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16th February 1933.— Examined and found correct.
(Signed) F. A. Bellamy, M.A., F.R.A.S.

Our last Annual Report not only completed a volume, but closed a memorable chapter in the history of this Society.

The present Report is the first of a new volume, and issued under the changed constitutional conditions now established. Its appearance bears witness to the redemption of a promise made to the late Dr G. C. Druce years ago, that in the case of necessity, I would step in and carry on the work of the Society In discharging this difficult duty, I have been met on all sides by the most kindly offers of co-operation and assistance, and therefore consider it my primary privilege and obligation to put on record my deep sense of gratification at the very general expressions of goodwill I have received.

The predominant impression produced upon my mind by the year's working has been the volume, variety, and value of its correspondence. I have been frankly astonished at its extent, and greatly encouraged by its character. Among other things, it has demonstrated most clearly how general is the common need among amateur botanists for some central source of enquiry as to their difficulties and needs. Any assistance given is always so highly appreciated that it is quite evident that in this direction alone we are dealing with a definite and very real need. In this connection I must thankfully acknowledge the very generous and ready help given by our referees, and by the authorities at the British Museum, South Kensington, and at Kew. It remains only to be said that while the bulk of this correspondence yields little or no material for the Report, I consider its educational value to be high, and as a means of fostering fellowship and intercourse between isolated botanists it should be encouraged in every way.

The financial position of the Society continues to be most satisfactory, and in order to maintain this favourable advantage we must keep our membership at a high level, and this can most easily be secured by the personal efforts of each member. Indeed, we trust that members will realise that the extent and value of our scientific work must in the future depend more largely than ever upon their individual contributions to the common stock. In varying degree—according to personal interest, environment and opportunity—all can make some addition to the sum of accurate botanical knowledge. One of the most urgent needs of the moment is the training of specialists, who will undertake the critical study of a particular genus. Another pressing requirement is to secure completeness and accuracy in our records of plant distribution, and its periodic changes. For this purpose we need in every county a Local Secretary who will undertake the collection and verification of all plant records for the area, and to whom we can refer botanical enquiries as to their authenticity. The Comital Flora could form the basis of such work, and we shall be pleased to hear from botanists willing to undertake this revision for a definite area—not necessarily limited to a county. We should like to see all Natural History Societies, Field Clubs, and other similar bodies affiliated to this Society, and their botanical work more often directed to definite scientific ends, such as the complete vegetative survey of a small area, or even of a single definite and distinct plant-association. Many such local Societies are already in membership with this Society, and we are at all times pleased to give prominence to records of their work. We suggest that some (all?) of their excursions should be open to members of this Society who may be able to attend them, and that an intimation to this effect on local programmes would be greatly appreciated.

The present Report differs, of necessity, from its predecessors in many directions which will be at once apparent. Our outstanding aim to establish and eventually pass on to the next generation a more complete and accurate record of British plant distribution than we already possess, has been constantly kept in mind, and evidences of it will be found in many parts of the Report. We are very greatly indebted to Mr P. M. Hall for undertaking the revision of all records in the *B.E.C. Reports* from 1926 to 1932 inclusive, to co-ordinate them with those of *Top. Bot.* and its supplements, the *Journal of Botany*, the *British Plant List*, and the *Comital Flora*. A complete list of the resultant corrections, additions or deletions will be found herewith in the Report. Next year we propose to publish a similar list for the Comital Flora, and shall be grateful for the kindly assistance of members in making this as complete as possible. Especial value belongs to the records of decreasing or extinct species in Britain, as this end of the distribution record has been relatively neglected. The papers by Mr W. D. Miller and Mr J. E. Little are valuable as examples of what can be done by individual effort in this direction.

We attach the utmost importance to the study of the varied ecological conditions under which plants grow, and the Report contains several suggestive notes and valuable papers of an ecological character. " If every member would attempt to solve one biological problem by attacking it from as many angles as possible—especially by means of experiment—the future accounts of the British flora would be more stable, more complete, and more accurate than they have hitherto been. Every reader of this Report must have at least one such problem ready to hand in his own vicinity, and its definite solution is well worth all the time and effort it might entail."

In the first week of September I attended the meetings of the British Association at York, and duly received the Programme and Daily Time-Table of its bewildering list of meetings in Sections A to M. As an example, on the opening morning, September 1st, there were no fewer than 14 meetings commencing at 10 a.m., and I should greatly have liked to attend 6 of them. This problem of selecting the one of greatest interest or value was constantly present during the week, and as a result I was unable to attend many meetings personally attractive. Of the meetings I did attend, I must admit that none seemed very thrilling, although Professor Priestley's Presidential Address on " The Growing Tree " to Section K (Botany) was an outstanding exception, and was greatly helped by an excellent exhibition in an adjoining room. I attended several of the botanical excursions and found them socially very enjoyable, but botanically disappointing. Many of them were little more than non-stop rambles, in which too much ground was covered for any detailed study of the vegetation. However, there were compensating advantages in conversation which were, in the aggregate, a liberal education. Among these, I prized an hour's talk with Mr H. N. Ridley, author of the magnificent "Dispersal of Plants" reviewed in *Rep. B.E.C.*, 1930, 315. He described how he accidentally discovered that the fruits of Juncus were capable of being dispersed by water. He was testing seeds of all sorts to see whether they floated or sank when thrown into water. Those of Juncus at once sank, and he was therefore justified in concluding that they were not included in the water-borne class. A few were accidentally left in water for several days, and were then found floating! Hence the necessity for a revision of his primary premise. On the same excursion I met Dr. T. W. Woodhead, of Huddersfield, who has done so much for Yorkshire botany, and whose paper on "Yorkshire Plant Ecology," in one of the British Association handbooks, is of absorbing interest and great value. In spare moments I visited York Minster, Ripon Cathedral, and the beautiful Fountains Abbey; indeed, the district is so rich in historic associations that I felt inclined to take the Town Clerk's advice to "stay on or come again."

A joint Botanical Conversazione with members of the Wild Flower Society was held in the Marylebone Room, Great Central Hotel, London, on Wednesday, 23rd November, 1932, and was largely attended. The Right Hon. the Earl Buxton, P.C., G.C.M.G., proved an excellent Chairman, and his opening address was very greatly enjoyed. He was followed by the Right Hon. Harold T. Baker, P.C.; Mr Dent, Mr Pearsall, and Sir W. M. Abbot Anderson, to whom was safely entrusted the omnibus vote of thanks. As the time allotted to these five speakers by G.H.Q. was limited to 40 minutes, they are to be heartily congratulated on so admirably keeping "within the law." A small exhibition of objects of botanical interest was much appreciated, and could have been greatly extended with more room. We are greatly indebted to Mrs Gertrude Foggitt for undertaking the very arduous and difficult duties involved in the organisation of this meeting, which was so successful and enjoyable that a general wish was expressed that it should become an annual institution.

To the authorities of the Royal Botanic Gardens at Kew and of the Natural History Museum at Cromwell Road, we are indebted for much kindly advice and willing assistance. Among foreign botanists, we are grateful to Prof. O. E. Schulz for naming the Cruciferae, Dr. K. Ronniger the Thymes, Dr. Almquist the Shepherd's Purses, Dr. P. Aellen the Chenopods, Prof. B. H. Danser the Polygonaceæ, Dr. H. Dahlsledt the Dandelions, Dr. F. Jaquet the Achemillas, Dr. R. Probst the Adventives, Dr. K. H. Zahn the Hawkweeds, Dr. H. Schinz the Adventives, Dr. G. Kükenthal the Carices, and Prof. J. Holmboe. To Mr R. H. Corstorphine we are indebted for specialised technical and scientific help in many directions, and for critical examinations of British species we are very grateful for the kindness shown by Dr. E. Drabble, Mr A. J. Wilmott, Mr J. S. L. Gilmour, Dr. W. B. Turrill,

Lt.-Col. A. H. Wolley-Dod, Rev. H. J. Riddelsdell, Mr W. C. Barton, Mr H. W. Pugsley, Mr W. O. Howarth, Mr P. M. Hall, Dr. W. A. Sledge, Mr J. Fraser, Mr C. E. Britton, Mr A. E. Wade, Mr W. Watson, Dr. F. W. Stansfield, Mr J. E. Little, and Dr. R. W. Butcher.

NEW MEMBERS.

Mr Wm. Chesher, M.A. (1933); Mrs R. W. Dent (rejoined, 1933); The Controller, Stationery Office (Publications Branch), Dublin (1933); Mr Chas. D. Heginbothom (1933); Miss C. Longfield, F.R.G.S., F.E.S., F.Z.S., M.B.O.U. (1933); Miss N. C. Massy (1933); Mr W. J. L. Palmer; Mr J. H. Peuson (1933); Mrs F. L. Rees; Rev. H. J. Riddelsdell, M.A., A.L.S. (rejoined, 1933); Miss Catherine M. Rob (1933); Prof. G. F. Scott Elliot; Mrs Olive G. Seward (1933); Mr W. A. P. Sprott, F.Z.S. (1933), Miss Agnes K. Swaine; Miss M. Taylor (1933); Tunbridge Wells Municipal Museum (1933); Mr E. C. Wallace; Miss Eivene M. Wright (1933); together with ten (1932) members included in the last Report, issued late in the year.

PLANT NOTES FOR 1932.

In future, the name of every genus, species or variety to be *added* to the *British Plant List* will be referred to in Plant Notes and there distinguished by a heavy Maltese Cross ✠ to indicate that it is a certified addition to that List.

In the case of a new genus or species, its new *number* will be given, and for a new variety its *letter* will be indicated, so that the Plant List may be kept entered up to date.

No records included under Plant Notes will be duplicated in County Records.

This section will also contain brief critical notes which are not of sufficient length to form separate papers.

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†21/13. ✠Papaver pinnatifidum Moris. Alien, Italy, Sardoa. Above quarry, Rievaulx, N.E. Yorks, Mr and Mrs Foggitt. A long way from a garden, but doubtless bird-sown. Det. Dr W. B. Turrill.

35/4 d. Nasturtium palustris DC., ✠var. d. fallax (Beck.) O.E.S. Avonmouth Docks, W. Gloster, 1932, C. Sandwith, det. Schulz.

†117/. ✠×Malva neglecta × parviflora. Waste heap, Welwyn, Herts, H. Phillips, det. Schinz.

123(2). ✠Corchorus.

†123(2)/1. ✠Corchorus olitorius L. Alien. [Tiliaceae]. New Genus, not in the Oxford List. Avonmouth Docks, W. Gloster, 1932, J. Gibbons.

†178/27. ✠Orobus vernus L. (Lathyrus vernus Bernh.). Guildford, Surrey, F. Clarke. Det. at Kew.

185/18(3). Rubus euoplus, nov. nom. replacing *R. perarmatus* in *Rep. B.E.C.*, 424, 1930, and *R. Salteri* Sudre (cit. Bab.) in *Rubi Europae* (1908-1913), p. 25, pl. xiii. Specimen, *Set of British Rubi*, No. 35, Aconbury, Heref., W. Watson.

185/52(2). R. dasycoccus, nov. nom. replacing *R. lasiocarpus* in *Rep. B.E.C.*, 435, 1930, and *R. amplificatus* Sudre (cit. Lees) in *Rubi Europae* (1908-1913), p. 47, pl. li. Specimen, *Set of British Rubi*, No. 33, Tintern, Mon., W. Watson.

†260/1. Scandicum pinnatifidum (Vent.) Thell. Brislington, Bristol, N. Somerset, 1921, J. Evans.

263(2). ✠Prangos.

263(2)/1. ✠Prangos Uechtritzii Boiss. et Haussk. in *Rep. B.E.C.*, 1931, p. 829. This plant was sent to the Club labelled tentatively " ? *Ferula*," as there had not been time to make a critical investigation of it. This may, perhaps, have misled Fraser, who has identified it as *Ferula angulata* Schlechtendal.

I have examined the specimens of the latter plant in the Kew Herbarium and have compared them with Schlechtendal's original description in *Linnea*, xvii, 125, 1843. One of the sheets in the herbarium is the type specimen or at least of the same gathering. The time and place of collection are the same but the sheet is numbered 403 while 603 is quoted in the description.

Boissier in *Ann. Sci. Nat.*, 3 Ser., Bot. I (1844), p. 319, reduces the plant to the status of a variety of *Ferulago linearifolia* Boiss., on the character of the asperulous down on the leaves. This character alone would distinguish the plant from that sent to the Club, though a superficial observer might confuse them on general appearances.

The main differences are as follows: The leaves of *Ferula angulata* are minutely scabrid pubescent, not smooth. Only young fruits of the *Ferula* were available. These are somewhat dorsally compressed rather than terete as in *Prangos* and have smooth rounded ridges, the marginal ridges being confluent. The young fruits of the *Prangos* have raised wavy ridges, with the marginal ridges free. In the few older fruits obtained from our plant, the ridges were corky. In the genus *Prangos* the fruit is laterally subcompressed or terete. The mericarps have five ridges, which may be corky or membranous and flat or undulate. The ridges are equal or the lateral may be broader. *Ferula* has dorsally compressed fruits with thin dorsal ridges and contiguous marginal ridges. In *Ferulago* there are three equidistant filiform dorsal ridges which may be raised and corky or winged but the lateral ridges are obsolete. The balance of characters seems to point to the genus *Prangos*.—R. Melville.

†281/1. Bifora radians M. Bieb. Avonmouth Docks, W. Gloster, 1932, J. Gibbons.

†307/4. ✠Lepicephalus alpinus L. (Cephalaria alpina (L.) Schrader). Woodwalton Fen, Hunts, H. Phillips, det. Schinz.

†356/3. Hemizonia Kelloggii Greene. Newhaven, Sussex. A rare Californian plant belonging to the group of " tarweeds " or " spikeweeds," and rarely seen in Britain. The late Mr C. Bailey reported it several times from St Anne's, Lancs, and the present is the only Sussex record. Lewis A. W. Burder.

†383/30(2). ✠Senecio leucanthemifolius Poir. The Mill, Huntingdon, June 19, 1932, H. Phillips. Det. Schinz.

419/69(3). ✠HIERACIUM SAXIFRAGUM Fries, modification (*fide* Hugo Dahlstedt, who saw James Sinclair's three specimens of his Reference No. 760, and his seven specimens of his Reference No. 770 at Skärsätra, Lidingö, Sweden, on 3rd January 1933). (1) Ref. No. 760, wood-rushy, heathery, mossy banks in a ravine, 390 feet above mean sea-level, Berriedale, Hoy, Orkney, 1st August 1932, James Sinclair. Native. Rare. Plants in flower and unripe fruit. In the living plant the leaves are glabrous and waxy above, thinly hairy beneath and on the margins and petioles; and the corolla, style and stigmas are yellow. (2) Ref. No. 770, heathery, mossy clefts of freestone crags in a ravine on hillside, south-east side of Enegars, near the Kame, Hoy, Orkney, 19th August 1932, James Sinclair. Native. Rare. Plants in flower and unripe fruit. In the living plant the leaves are glabrous on both surfaces except a few scattered hairs on the midrib on the under surface of the leaf, with hairy petioles; and the corolla, style and stigmas are yellow. *H. saxifragum* Fries belongs to Zahn's capital or group-species *H. saxifragum* Fries, and in *The London Catalogue of British Plants*, eleventh edition (1925), it should be inserted between Nos. 1052 and 1053. A new record for v.-c. 111, discovered by James Sinclair, jun. H. H. JOHNSTON.

419/118(2). ✠H. SUBEXPALLESCENS Dahlstedt, n. sp. Caulis 10-15 (20) cm. altus gracilis 1-2-foliosus basi obscure purpurascens pilis mollibus ± sparsis pilosus medio subglaber superne iterum pilis mollibus sparsis obsitus leviter stellatus parce glandulosus. Folia laete viridia subtus pallidiora et saepe ± violascentia, rosularia 2-5 exteriora ± ovalia integra ± obtusa, reliqua ± lanceolata—ovato-lanceolata parce denticulata vel dentata acuta, supra parce subtus in pagina sparse et in nervo dorsali dense longe et molliter pilosa longe petiolata; caulina 1-2, infimum longe petiolatum lanceolatum acutum praesertim ad basin breve dentatum, summum breve petiolatum lineari-lanceolatum—lineare sparse et acutae brevi—dentatum acutum. Inflorescentia paniculata saepe ramo ± distante acuta ramis et pedicellis sat rectis ± erecto-patentibus acladium 10-15 mm. longum ± superantibus sat dense stellatis sparse superne (praesertim in pedicellentis) pilis brevibus ± obscuris densiusculis et glandulis parcis—singulis parvis—minutis vestitis. Involucrum parvum ± cano-viride basi ovata. Squamae exteriores breves lineares reliquae e basi latiore lanceolato-lineares—lineares ± obtusae apice leviter comosae pilis brevibus obscuris ± densiusculus—sat densis et glandulis minutis parcis vel singulis vestitae dorso sparse in marginibus praesertim apicem versus sat dense floccosae. Calathium parvum 25-35 mm. diametro. Ligulae sat obscure luteae. Antherae polline carentes. Stylus cum stigmatibus ± fusco-virescens. Achenium nigrum.

H. subexpallescens Dahlstedt belongs to *Vulgata*, and is related to the Swedish species *Hieracium expallescens* Dahlstedt, but differs from it through narrower less dentated leaves, generally two narrow leaves on the stem, and narrower and more obtuse phyllaries.

According to the heads it somewhat resembles *H. lanuginosum* Lönnroth, but differs through its more entire leaves and less glandular phyllaries. *H. subexpallescens* Dahlstedt belongs to Zahn's capital or group-species *H. sagittatum* (Lindeberg) Dahlstedt, and in *The London Catalogue of British Plants*, eleventh edition (1925), it should be inserted between Nos. 1096 and 1097.

Locality.—(1) My Reference No. 4532 and James Sinclair's Reference No. 759, heathery, wood-rushy, mossy, freestone sea-cliffs, 200 feet above mean sea-level, Enegars, Craig Gate, south-east side of Rack Wick, Hoy, Orkney, 1st August 1932, H. H. Johnston, and James Sinclair. Native. Rare. Plants in full flower and sparingly in fruit. (2) My Reference No. 4536, moist mossy soil on sandstone crags on hillside, 430 feet above mean sea-level, Dwarfie Hamars, Hoy, Orkney, 2nd August 1932, H. H. Johnston and James Sinclair, jun. Native. Rare. Plants moderately in flower. In the living plant of my Reference No. 4532, the leaves are green above, paler green or rarely purplish beneath, hairy on both surfaces and on the margins; corolla yellow; and style and its two recoiled branches yellowish-brown. This new species was discovered by James Sinclair, jun., and me, at Enegars, Craig Gate, Rack Wick, Hoy, on 10th August 1931. H. H. JOHNSTON.

419/243(2). ✠H. POLYPHYLLUM Dahlstedt, n. sp. Aphyllopodum. Caulis 25-35 cm. altus, polyphyllus parce superne sparse et breve scabrido-pilosus pilis paucis longioribus immixtis leviter stellatus. Folia numerosa obscure viridia subtus pallidiores utrinque et in marginibus breve—brevissime scabrido—pilosa, infima sub anthesi emarcida, inferiora ± lanceolata et ± distantia, intermedia magis approximata ± ovato-lanceolata, superiora basi lata subamplectentia et breve—sat longe acuta omnia in inferiore parte et acute dentata summa magis distantia integra acuta. Inflorescentia polycephala ± corymbosa ramis longis breve et scabrido—pilosis pilis longioribus paucis immixtis ± stellatis pedicellis brevibus ± scabrido-pilosis et parce longe—pilosis densius stellatis, acladium 25-45 mm. longum superantibus vel aequantibus. Involucrum ± atroviride mediocre—sat parvum basi ovata, squamis exterioribus paucis brevibus interioribus sat longis omnibus e basi latiore ± lineari—lanceolatis ± acutis. Calathium parvum circa 35 mm. diametro. Ligulae obscure luteae. Antherae non polliniferae. Stylus obscure luteus-melleus. Achenium fulvum.

This species is not identical with *Hieracium salicifolium* Lindeberg, but is probably related to it. It differs through having shorter dark heads clothed with minute glandules and few short hairs, shorter broader leaves, which resemble those of *H. crocatum* Fries.

H. polyphyllum Dahlstedt belongs to Zahn's capital or group-species *Hieracium aestivum* Fries, and in *The London Catalogue of British Plants*, eleventh edition (1925), it should be inserted between Nos. 1241 and 1242.

In *The London Catalogue of British Plants*, eleventh edition (1925), Zahn's capital or group-species *Hieracium aestivum* Fries includes the sub-species Nos. 1241-1248, in Section 8 *Umbellata*, but, in the opinion of Dr Hugo Dahlstedt, this capital or group-species should be included in Section 7 *Tridentata*, near Zahn's capital or group-species *H. inuloides* Tausch, which includes the sub-species Nos. 1229-1238.

Locality.—(1) Freestone sea-cliffs, Hobbister, Orphir, Mainland, Orkney, 11th August 1880, H. H. Johnston. Native. Plants in full flower and sparingly in unripe fruit. Note.—My specimen was determined as "*H. strictum* Fries" by the late Dr John Thomas Irvine Boswell Boswell (*né* John Thomas Syme, and thereafter John Thomas Boswell Syme); as "*H. corymbosum* Fries, var. *salicifolium* (Lindeberg)," by Mr Frederick Janson Hanbury, on 4th December 1894; and as "*H. salicifolium* Lindeberg" by the late Rev. John Roffey, on 15th November 1926. (2) Grassy, rocky freestone sea-cliffs, 15-20 feet above mean sea-level, between Lee Craig and Stanger Head, Hoxa Sound, Flotta, Orkney, (*a*) Reference No. 2847 (plants in full fruit and sparingly in flower), 26th September 1924, H. H. Johnston; and (*b*) Reference No. 4560 (plants in full flower and sparingly in unripe fruit), 15th August 1932, H. H. Johnston. Native. Common. In the living plant of Reference No. 4560, the stem is clothed with long hairs and short hispid hairs; leaves dull green above, paler green beneath, shortly hispid on both surfaces and on the margins; corolla yellow; and style with its two recoiled branches yellow. The ripe achenes of Reference No. 2847 are fulvous. James Sinclair's two specimens of his Reference No. 763 were collected by him, in my company, at Hoxa Sound, Flotta, on 15th August 1932. Note.—My specimen of Reference No. 2847 was determined as "*H. auratum* Fries" by the late Mr John Cryer on 7th May 1925; and as "*H. salicifolium* Lindeberg" by the late Rev. John Roffey on 15th November 1926. H. H. JOHNSTON.

423. NOTES UPON THE COLLECTING AND STUDY OF TARAXACA. Every species of *Taraxacum* occurs in two extreme modifications connected by intermediate stages, one with more or less laciniated or lobated leaves, the other with broader, entire or nearly entire leaves. The former represents the type of the species and occurs on more or less open grassy places, natural or artificial meadows, and similar habitats. For an exact determination and description it is necessary to collect the plants in the condition when the specimens assume their distinguishing marks. The latter modification, with more or less entire leaves, ordinarily occurs in shady or wet places or on more or less well-nourished ground and is shown best by young plants and in the autumn. In this state the several species very nearly resemble each other, and in many cases it is very difficult or impossible to determine the species. The two modifications are connected by intermediate forms, but only by study in the field is it possible to find out the actual connection between the extreme forms. It is, therefore, of importance for a true knowledge of a species, at first only to collect the typical lobated modification. Later, one may, by study in the field, observe how the two modifications are connected. It is also of great importance to observe the form of the outer phyllaries,

if adpressed to the inner ones or patent or more or less retroflexed, and their length. In gathering it is very important to press the heads from the side to make it possible to observe the phyllaries and the heads in dried plants. A piece of cardboard or paper ought to be placed round the head in the field, and this need not be changed before the plant is dried. The leaves must also be spread out so that they cover each other as little as possible. Changing in dry paper is necessary to preserve the colour of the leaves. H. Dahlstedt.

423/11(2). ✠Taraxacum Vachellii Dahlst., n.sp. Folia sat laete viridia multiloba lobis mediocriter longis triangularibus-deltoideis basi sat lata dorso saepe ± convexis acutiusculis integris, vel inferioribus parce dentatis, lobo terminali breve triangulari-hastato, acuto-acuminato in exterioribus paucis mediocri—sat magno obtusiusculo, petiolis et nervo mediano leviter coloratis. Scapi pallidi inferne leviter colorati. Involucrum atroviride gracile mediocre. Squamae exteriores latae adpressae ovato-lanceolatae—lanceolatae, breves, interiores lineari-lanceolatae, omnes sine appendice infra apicem vel levissime callosae. Calathium ignotum. Antherae et stylus ignota. Achenium rubrum mediocre conico-cylindricum. Rostrum 7-8 mm. longum.

This species belongs to the Section *Erythrosperma*. From most other species of this group it differs in nearly lacking appendages on its phyllaries. It differs from *T. proximum* Dahlst. in its leaves, which are very like those of a species from Germany that I had previously named *T. silesiacum*, but have not yet described. H. Dahlstedt.

Discovered by and named after Miss E. Vachell.

423/41(2). ✠T. angliciforme Dahlst. Taff Fechan Gorge, near Merthyr, Glamorgan, 1931, Miss E. Vachell. "Seems to differ from *T. anglicum* only through its blunter end-lobes, and is possibly only a modification of it. Ought, however, to be further observed."—D. Dahlstedt, *in litt.*

423/79(2). ✠T. platylobum Dahlst., n. sp. ad interim. Folia sat laete viridia ± lanceolata lobis latis—latissimis triangularibus—deltoideis ± denticulatis-dentatis acutis, lobo terminali magno triangulari-hastato intergro vel parce et grosse dentato obtuso—obtusiusculo, petiolis et nervo mediano ± pallidis. Scapi longi pallidi. Involucrum magnum ± atroviride. Squamae exteriores et basi latiore ± lineari-lanceolatae ± reflexae. Calathium ut videtur sat latum. Ligulae sat obscure luteae, marginales extus ± cano-violaceo-vittatae. Antherae polliniferae. Stylus luteus, stigmatibus ± fusco-virescentibus. Achenium sordide stramineum apice ± spinulosum caeterim ± tuberculatum sensim in pyramiden brevem conico-cylindricam abiens. Rostrum circa 10 mm. longum.

This species belongs to the Section *Vulgaria*, and seems to be in some degree related to *T. Ekmanii* Dahlst. from Sweden, H. Dahlstedt.

Hitchin, Herts, 1932, H. Phillips.

423/81(3). ✠T. PRAERADIANTIFRONS Dahlst. Folia laete viridia elongate-lanceolata multiloba, lobis distantibus longis, inferioribus angustis superioribus ad basin ± latis omnibus sensim—sat abrupte in apicem longum—longissimum attenuatis patentibus, leviter reflexis, parce et acute saepe longe subulato-dentatis—subintegris, lobo terminali hastato-sagittato lobulis lateralibus ± patentibus—retroversis, lobo mediano elongato subintegro vel medio obtuse inciso elongato ± acuto—obtusiusculo. Scapi plures folia aequantes vel superantes apice—basique ± colorati, petiolis et nervo mediano pallidis. Involucrum mediocre—sat magnum ± atroviride. Squamae exteriores ± curvato-reflexae—latiusculae ± lanceolatae-ovato—lanceolatae. Calathium mediocre, circa 75 mm. diametro. Ligulae obscurae luteae, marginales subtus stria rubro-violacea notatae. Antherae parce polliniferae. Stylus sordide luteus, stigmatibus ± fusco-virescentibus. Achenium fusco-stramineum apice breviter spinulosum, caeterum ± tuberculatum in pyramiden brevem conico-cylindricam spinulosam sensim abiens, circa 3.5 mm. longum, circa 1 mm. latum. Rostrum circa 9 mm. longum.

This species belongs to the Section *Vulgaria*. Its leaves resemble, in some degree, those of *T. praeradians* Dahlst. from Sweden, but differ from it in their pale petioles and midribs. The curvate-reflexed, not retroflexed, more narrow outer phyllaries are also distinct from those of *T. praeradians*, H. DAHLSTEDT.

Hitchin, Herts, 1932, H. PHILLIPS.

†425/9. LACTUCA TATARICA (L.) C. A. Meyer. Avonmouth Docks, W. Gloster, 1932, C. SANDWITH and J. EVANS.

430(2). ✠ZACYNTHA.

†430(2)/1. ✠ZACYNTHA VERRUCOSA Gaertn. New genus of the Compositae, not in the Oxford List. Brislington, Bristol, N. Somerset, 1913, J. EVANS.

457/4. LIMONIUM RETICULATUM Mill. In Dr Druce's *Comital Flora* (p. 193) this is said to be extinct in W. Norfolk, v.-c. 28. I have a specimen of this, collected in August 1932 by Mr J. R. Peace of the Oxford Forestry School from the saltmarsh at Holme-next-the-Sea, near Hunstanton. The plant has been known there for some years—see the *Journal of Ecology*, vol. iii, pp. 81 and 83, and vol. viii, p. 237. Mr Peace says that some quantity exists, though the species is less frequent than *L. vulgare* Mill. and *L. binervosum* C.E.S., which also occur there. He has personally observed it at Holme-next-the-Sea since 1913, when the ecological work on the saltmarsh was begun. I have to retain the present specimen in connection with the ecological work of Mr Peace, but will try to obtain more next year for the Society's herbarium.—P. G. BEAK.

†518/4. PHYSALIS PUBESCENS L. Avonmouth Docks, W. Gloster, 1932, J. GIBBONS and J. EVANS.

†527/20. ✠Verbascum pulchrum Vel. Portishead Dock, N. Somerset, 1932, C. Sandwith. Det. by Dr W. B. Turrill, at Kew. Not in the Oxford List.

†543/41. ✠Veronica filiformis Sm. Lewes, Sussex, Miss K. Pickard.

558/3. Mentha sp. [Ref. No. Z.351]. Very aromatic. Leaves grey-green, flowers lilac. Damp sandy ground, Cothill, Berks, August 15, 1932. One small patch only seen, P. G. Beak. ×*Mentha niliaca* Jacq., var. *Halleri* Briq. This comes very close to ×*M. niliaca* Jacq., var. *sapida* (Tausch) Briquet, but the leaves are shorter and much less woolly or velvety to the touch. This is the second time I have seen var. *Halleri* Briq. from Berks. The var. *sapida* I have not seen from England, but it is widely though locally distributed in Scotland.—J. Fraser.

558/12 h. ✠×M. rubra Sm., var. h. Toddiana Fraser, nov. var. Stem erect, stout, flexuous, purple, branched, thinly and shortly pubescent, with reflexed hairs, 3-4 ft. high; internodes 5-8 cm. long; branches sharply ascending, flexuous. Leaves 4-9 cm. by 1.5-3.3 cm. broad, oblong to elliptic-oblong, petiolate, serrate, shortly cuneate at the base, those on the branches more nearly rounded at the base, with a sprinkling of hairs on the upper face, and thinly pilose beneath on the primary and secondary nerves; serratures directed forward, 0.5-3 mm. deep, acute, with 1-2 denticles occasionally between the larger ones; terminal tooth ovate to triangular, 6-10 mm. long, acute to acuminate. Bracts lanceolate, the lowest pair 3.5 × 1.5 cm.; the second pair 15 × 4 mm.; and the third pair 10 × 2.25 mm., all acuminate. Inflorescence spicate at first, gradually becoming verticillate, with two or three of the lower verticils shortly stalked. Calyx tubular, glandular, glabrous; teeth thinly ciliate, with 2-4 jointed hairs; pedicels glabrous. Corolla purple, glabrous or nearly so from the first. Stamens included, with imperfect anthers, but that may not always be so in this hybrid.

The variety can easily be recognised by the long and narrow leaves, the narrow bracts rapidly decreasing in size, and the deep serratures on the leaves of the main stem. I have never seen such long leaves in any form of ×*M. rubra* Sm., which the late Jean Briquet considered was the hybrid, *M. verticillata* × *spicata*. This new variety was gathered at the roadside, Sebergham, Cumberland, by Miss Emily S. Todd, on August 20, 1932.—J. Fraser.

562/5. Satureia ascendens (Jord.) Dr. [Ref. No. Z.358]. Sunny roadside bank, Marcham, Berks, August 22, 1932.—P. G. Beak. Correct for Druce's List. Some of the upper leaves are more narrowed toward the apex than usual, but all the other characters are correct. L'Abbé Coste adopts the name *Calamintha ascendens* Clairv.—J. Fraser.

562/8. S. Acinos Scheele. [Ref. No. Z.306]. Branches strong and wiry, from a firm, half-woody rootstock. Growing on a wall at Pusey, Berks, July 6, 1932. This specimen differs from the plant previously known to me as *S. Acinos* in its larger proportions; its almost certainly perennial rootstock; its more rigid, thick and strongly-nerved leaves, and in its flowers—not pinkish-purple but almost violet, with white blotches. What is the duration of *S. Acinos?* I find only Druce's *Comital Flora* calling it perennial, as this specimen would suggest.—P. G. Beak. Correct according to Scheele and the adoption of the name by the late Dr Druce. The leaves are lanceolate, often *acute*, and the calyx is very gibbous at the base. In both these characters it differs from *S. alpina* Scheele on the continent. The last-named has a larger white blotch on the lower lip, and its leaves are elliptic and *obtuse*. The depth of colour of the corolla varies. *S. Acinos* can be annual or biennial, but on a wall it may live longer and perhaps not flower till the third year, owing to lack of moisture. It varies in the length of the stem, from 4-16 inches.—J. Fraser.

564/1. Hyssopus officinalis L. Beaulieu Abbey, October 12, 1912, J. Cosmo Melvill. *Rep. B.E.C.*, 1915, p. 364. Nor is this plant *Hyssopus officinalis* L.! It is *Satureia montana* L., very different from Mr Bickham's specimens. A correspondent states that the Hyssop is said to have died out long ago.—A. J. Wilmott.

600/8 cc. ✠Chenopodium album L., var. cc. virgatum (Thbg.) Aellen. Waste ground, Bedminster, Bristol, N. Somerset, 1930. A tall plant with rosy red stem, C. & N. Sandwith. Det. Aellen.

†600/34(5). ✠C. acuminatum Willd. Bristol Harbour, N. Somerset, 1931, J. Evans. Not in the Oxford List.

606/3. Atriplex patula L., f. farinosa Fries. Seashore, Hoy, Orkney, 1931, G. C. Druce. Det. Aellen.

606/3 i. ✠A. patula L., var. i. angustifolia Lange (± crassa M. & K.). Welwyn, Hunts, 1931, H. Phillips. Det. Aellen.

618/9. ✠Rumex conglomeratus × sanguineus = R. Ruhmeri Hausskn., "probabiliter." Near Avebury, N. Wilts, 1931, G. C. Druce. Det. Danser.

618/22. R. dentatus Campd. ✠Sub-sp. A. Halacsyi Rech. f. Cf. *Berk. Bot. Centralbl.*, xlix (1932), 2, p. 16. Avonmouth, W. Gloucester, 1931, C. & N. Sandwith. ✠Sub-sp. B. Klotzschianus Rech. f. Cf. *Berk. Bot. Centralbl.*, xlix (1932), 2, p. 19. Bristol, W. Gloucester, 1926; Bedminster, Bristol, N. Somerset, 1928, C. & N. Sandwith.

*650/10. ✠Salix atrocinerea × nigricans. Ben Laoigh and Ben Lawers, M. Perth, Mrs Macalister Hall. Det. Fraser, who says:—"*S. cinerea* L. is not British. The British plant is *S. atrocinerea* Brotero, which has red hairs, and is a native of Portugal, Spain and the British Isles. *S. cinerea* L. has white hairs on both sides of the leaves, more or less tomentose, and is Continental but not British."

684/. Narcissus. A Monograph of *Narcissus*, sub-genus *Ajax*, by H. W. Pugsley in the *Journal of the Royal Horticultural Society*, February 1933, includes the following native British forms (reckoning the Tenby daffodil as native for this purpose):—

Sub-genus Ajax Spach.

Section II. Pseudo-Narcissus Pugsley.

Series II. Lutei Pugsley.

684/1(2). N. obvallaris Salisbury = *N. Pseudo-Narcissus* L., var. *lobularis* (Haworth) of the *Br. Pl. List*, 684/1 b.

684/1(2) b. ✠Var. concolor Pugsley, var. nov. = *N. Pseudo-Narcissus*, var. *concolor* Bromfield, *Fl. Vect.*, ii, 497 (1856) = var. *Bromfieldii* Syme, *Eng. Bot.*, ed. 3, ix, 158 (1869) ex parte. This variety differs from the specific type in its longer perianth-tube, less distinctly lobed corona and globose capsule. Only known from Isle of Wight, where it was probably an introduced plant and is now believed to be extinct.

Series III. Vulgares Pugsley.

684/1. N. Pseudo-Narcissus L. 684/1 of the *Br. Pl. List*. ✠Forma *lutescens* Pugsley, forma nova: distinguished by having clear yellow perianth segments. Sometimes nearly concolorous with the corona, and corona generally broader than in the type, with more regularly rounded lobes and less plication. This form is found growing with the type.

684/1 b. ✠Var. humilis Pugsley, var. nov.: plant dwarf with small, lightish flowers, perianth segments whitish, ± spreading, corona yellow, serrated. Found in Derbyshire, N. England, and South Scotland.

684/1 c. ✠Var. insignis Pugsley, var. nov.: a large-flowered plant, with perianth tube and corona broader than in the type, perianth segments broadly ovate to elliptic lanceolate, strongly imbricated. Known from Hereford and Gloucestershire.

The present var. c. of the *Br. Pl. List*, var. *eysttetensis* Hort., is not referred to and should be deleted from the List.

With regard to the introduced species in the *Plant List*, *N. hispanicus* Gouan is now adopted as the correct name of *N. major* Curtis (684/2), while *N. serratus* Haworth (684/5) is apparently no longer recognised as a separate species, distinguishable from *N. Pseudo-Narcissus* L.—P. M. Hall.

718/d. Juncus. *Rep. B.E.C.*, 1931 (p. 609), lines 21 et seq.: Under " A New *Juncus* in Scotland (found by the Rev. E. S. Marshall), H. W. Pugsley, p. 278," for " A distinct species, which will probably be reduced to the rank of a sub-species or variety of *subnodulosus* Wahlb.," read " It seems best to treat the plant as a distinct species, which will possibly be reduced to the rank of a sub-species or variety of *J. nodulosus* Wahlb. if further information proves that it is more closely connected with that species than at present appears." The succeeding statement that "Buchenau already records it as forma *gracilis*" is erroneous.—H.W.P.

737/. POTAMOGETON. In Prof. M. L. Fernald's superb monograph on *The Linear-leaved North American Species of Potamogeton* (1932), are the following valuable descriptions of four species found also in Britain. These descriptions are of especial value from the fact that they are not mere compilations but the original results of long and careful observation of actual plants. They are much fuller than usual, and are quantitatively expressed in most accurate measurements.

P. OBTUSIFOLIUS Mertens & Koch.

Stem springing from a large winter-bud, much branched or, in elongate specimens, slightly so, *a little compressed*, *slender*, 0.1-1 m. long: *leaves* linear, *red or a warm-green* when fresh, usually with *2 large* translucent *glands* at base; the *primary leaves 0.4-1 dm. long, 2-4 mm. broad*, rounded at tip and subapiculate, *very translucent, with the broad compound midrib bordered, especially from the base to above the middle, by 2-4 bands of areolae on each side*, with 2 (rarely 4) very *faint lateral nerves joining the midrib at the tip*: *stipules* rather broad, delicately many-nerved, obtuse, *1.2-2 cm. long*: *glands on the primary stem becoming 0.6-1.2 mm. broad*: *peduncles* in the upper axils, *slender, straight, ascending, 0.8-2* (rarely -6) *cm. long*: *spikes* dense, *thick-cylindric*, in maturity *0.6-1.3 cm. long*: sepaloid connectives firm, short-clawed, broadly oblate, 1-1.6 mm. long: *fruits* slightly compressed, obliquely obovoid, *3-4 mm. long, 2-2.3 mm. broad*, with a low acutish keel on the rounded back, convex on the ventral margin and tapering to a very short (0.4-0.8 mm. long) erect beak: *winter-buds* terminal, narrowly flabelliform; *their narrowly oblong scarious bodies 2-4 cm. long, 3.5-7 mm. broad*; *their leaves 0.4-1 dm. long, much exceeding the scarious faintly nerved stipules.*

P. obtusifolius Mert. & Koch in Roehling, Deutschl. Fl. 855 (1823); Cham. & Schl. Linnaea, ii, 178 (1827); Hornem. Fl. Dan., xii, fasc. xxxvi, 4, t. mmcvii (1834); Reichenb. Ic. Fl. Germ. Helv., vii, 16, t. xxv (1845); Morong, Mem. Torr. Bot. Cl. iii^2, 40, t. xlviii (1893); Graebn. in Engler, Pflanzenr., iv^{11}, 108, fig. 27A-D (1907); N. Taylor, N. A. Fl., $xvii^1$, 25 (1909); Ar. Benn. in Fryer & Benn. Pot. Brit. Isl. 80, t. 52 (1915); Hagström, Crit. Research. Pot. 115, fig. 51 (1916).

P. compressus Roth, Tent. Fl. Germ., i, 73 (1788). not L.

P. gramineus Sm. Eng. Bot., xxxii, t. 2253 (1811), not L.

P. compressus, var. *obtusus* Schlechtd. Fl. Berol., i, 117 (1823).

P. obtusifolius, var. *latifolius* Fieber, Pot. Böhm., 38 (1838); var. *angustifolius* Fieber, *l.c.*; var. *elongatus* Graebn., *l.c.* 109, and var.

vulgaris Graebn., *l.c.*; all minor (chiefly ecological) forms, showing fluctuation in the breadth and length of leaf, degree of branching or elongation of stem, etc., and with little or no taxonomic value.

Spirillus obtusifolius (M. & K.) Nieuwl. Am. Midl. Nat., iii, 19 (1913).

P. foliosus, var. *diffusus* Ar. Bennett, Bot. Soc. and Exch. Cl. Brit. Isl. Rep., vi, 860 (1923).

P. Friesii Ruprecht.

Stem springing from a winter-bud, compressed-filiform, 0.1-1 m. or more long, *simple or subsimple below*, subsimple or forking above and *producing numerous very short branches or leaf-tufts which later develop into winter-buds*: *leaves* uniform, linear, *bright-green and translucent*; *the primary ones* 2.5-8.5 (-10) cm. long, *1.5-3.5 mm. broad*, *obtuse or rounded at tip*, mucronate, *5-7-nerved*; the midrib usually bordered at least near the base by a slender *band of elongate lacunae* on each side; the *median nerves* finer but *distinct*, *joining the midrib well below the tip* and with frequent *distinct transverse connections*; the *marginal joining the median 2-4 mm. farther down*: *stipules strongly fibrous*, whitish, the young *connate* below, acute or acutish, *7-11 mm. long, in age lacerate and 2-cleft*, usually with a pair of basal *glands 0.3-0.8* (rarely -1) *mm. in diameter*: *peduncles flattened*, slightly *broadened upward*, straight or ascending, *1.5-5 cm. long*: *spike* interruptedly cylindric, in maturity *0.7-1.5 cm. long, with 3-4 remote whorls of flowers*: sepaloid connectives herbaceous, 1.5-2.5 mm. long, with slender claw and broadly dilated limb: *fruits* slightly compressed, obliquely ovoid or obovoid, *2-3 mm. long, 1.5-2 mm. broad*; the rounded back obscurely 3-keeled; the ventral face convex, tapering to the short (0.2-0.8 mm.) erect or recurving beak: *winter-buds* terminal *on short lateral branches*, narrowly flabelliform; *their oblong-lanceolate bodies 1.2-2.5 cm. long, 2-4 mm. broad, covered with coarsely fibrous* and often *shredded pale stipules*; *their loosely ascending leaves 2-4 cm. long.*

P. Friesii Rupr. Beitr. Pfl. Ross. Reich., iv, 43 (1845); Ar. Benn. Journ. Bot., xxviii, 302 (1890); Rob. & Fern. in Gray, Man., ed. 7: 75 (1908); N. Taylor, N. A. Fl., xvii^1, 24 (1909); A. Benn. in Fryer & Benn. Pot. Brit. Isl., 81, t. 53 (1915); Butcher & Strudwick, Furth. Ill. Brit. Pl., 370 (1930).

P. compressus Oeder, Fl. Dan., ii, fasc. iv, t. 203 (1766); Fieber, Pot. Böhm., 36, t. iii, fig. 18 (1838); Reichenb. Ic. Fl. Germ. Helv., vii, 15, t. xxiv (1845); not L.

P. compressus, β *tenuior* Wahlenb. Fl. Ups., 60 (1820).

P. compressus, β *elongatus* Wahlenb. Fl. Suec., 107 (1824).

P. pusillus, α *major* Fries, Nov. Fl. Suec., ed. 2: 48 (1828).

P. pusillus, var. *latifolius* Meyer, Chlor. Honov., 525 (1836).

P. mucronatus Schrad. ex. Reichenb. Ic. Fl. Germ. Helv., vii, 15, t. xxiv (1845).

The name *Potamogeton mucronatus* Schrad., maintained by many European botanists, has no nomenclatural status. It is said to start in Roem. & Schult. Syst., iii, 517 (1818), but its publication there was simply as an unidentified *nomen nudum*; Roemer & Schultes, at the end of the treatment of *Potamogeton*, appending two unknowns, one of them " Quid *P. mucronatus* Schrad." That, of course, gives the name no status. It is next cited as dating from Reichenb. Icon. Fl. Germ. Helv., vii, 15, t. xxiv (1845); but Reichenbach definitely maintained for the plant the name *P. compressus* and appended as a synonym " *P. mucronatus* Schrader, R. S. III, p. 517!" Here, again, the name *P. mucronatus*, taken up merely as a synonym, fails of valid publication; and it should give way to the properly published *P. Friesii* Rupr. (1845).

P. PUSILLUS Linnaeus.

Plants usually (perhaps always) springing from winter-buds and without elongate rootstock: stems capillary, subterete, 0.05-1 m. long, subsimple to freely branching; the branches very often terminated by winter-buds: *leaves linear to linear-setaceous*, commonly with a pair of *small translucent glands at base*, 0.8-8.5 cm. long, *0.3-2.4 mm. wide*, rounded at tip to sharply acute, usually mucronulate, 3-nerved (lateral nerves obscure in narrowest-leaved or most translucent-leaved forms), deep-green and rather firm or sometimes fulvous or light-green, translucent and flaccid; lateral nerves, when not evanescent, joining the midrib one-fourth to one leaf-breadth below the tip; *midrib bordered on each side* (at least in its lower half) *by 1 or more rows of lacunae*; uppermost or involucral leaves commonly thicker and slightly broader than the lower and often with several rows of lacunae: *stipules flat or with inrolled but free margins*, hyaline to subherbaceous, faintly nerved, *obtuse* (often appearing acute when inrolled), *3-14 mm. long*: *peduncles* from the upper axils, *filiform*, scarcely thickened upward, ascending, *0.35-3 (rarely -4.5) cm. long*: *spikes subglobose*, in fruit *subcontinuous or but slightly interrupted, 2-8 mm. long, of 1-3 few-flowered whorls*: sepaloid connectives round-flabelliform, with slender claw, 1-2 mm. long: *fruits* but slightly compressed, dark-olivaceous, obliquely obovoid, *2-2.5 mm. long*, 1.2-1.9 mm. broad, *commonly rugulose on the surface* (at least when dry); *the rounded back* (in dry material) *with an obscure and very low broad keel*; the ventral face arching to a very *short erect or slightly curved submarginal beak*: *winter-buds terminating the branches*; *their fusiform bodies olivaceous, 7-18 mm. long, 0.6-2.5 mm. broad, the inner leaves commonly covered by the subherbaceous to membranous only faintly nerved stipules*; the divergently ascending lower leaves 0.8-3.2 cm. long.

A highly variable circumboreal species of which innumerable subspecies, varieties, and forms have been proposed. The extremes of these varieties appear very distinct, but they all have similar fruit and winter-buds, and many transitional specimens indicate that they are a confluent series. In North America the following seem to be most worth recognition:—

- *a.* Leaf-tips subacute to sharply pointed (only exceptionally obtuse)......*b.*
  - *b.* Midrib of principal leaves (below the involucral leaves) bordered on each side by 1 or 2 rows of lacunae......*c.*
    - *c.* Primary leaves (of the principal stems) 0.5-1.5 mm. wide, with well defined lacunae often in 2 rows each side of the midrib in the lower half of the leaf .... Var. *typicus.*
    - *c.* Primary leaves 0.3-1 mm. wide, with a single row of frequently evanescent lacunae each side of the midrib .... Var. *tenuissimus.*
  - *b.* Midrib of principal leaves bordered on each side by 3-5 bands of coarse lacunae .... Var. *lacunatus.*
- *a.* Leaf-tips mostly rounded or obtuse......*d.*
  - *d.* Midrib bordered on each side by 1 row (sometimes 2 at base) of lacunae; foliage mostly dark- to light-green......*e.*
    - *e.* Principal leaves 3-7 cm. long .... Var. *mucronatus.*
    - *e.* Principal leaves 0.8-2.5 cm. long .... Var. *polyphyllus.*
  - *d.* Midrib bordered on each side by 2-4 bands of lacunae; foliage fulvous .... Var. *colpophilus.*

P. PANORMITANUS Bivona-Bernardi.

Plants usually, perhaps always, springing from winter-buds and without elongate rootstock: stems capillary, slightly compressed, elongate, up to 1 m. or more long, usually much branched; the branches and often their *short lateral branchlets frequently* (late in the season usually) *terminated by winter-buds*: *leaves linear to linear-setaceous, firm*, usually with a pair of *small translucent glands at base*, 0.8-7 cm. long, 0.3-3 mm. broad, acute to obtuse, 3 (rarely 5)-nerved (lateral nerves obscure in narrowest- and most rigid-leaved extremes), light-green; lateral nerves joining the midrib one-half to two leaf-breadths below the tip; *midrib prominent beneath, usually not bordered by lacunae* (sometimes with 1 band of lacunae on each side); uppermost or involucral leaves sometimes with well-developed lacunae: *stipules scarious-membranaceous, slenderly tubular, with margins united to above the middle, finally rupturing and becoming lacerate* (*but hardly rigid*) *at summit*, 0.6-1.7 cm. long: *peduncles* from the upper axils, *filiform*, not enlarged at summit, strongly ascending, *1.5-8 cm. long*: *spikes elongate, strongly interrupted, 6-12 mm. long, of 3-5 distant few-flowered whorls*: sepaloid connectives rounded-flabelliform, slender-clawed, 1.2-2 mm. long: *fruits light-olivaceous*, obliquely obovoid, usually somewhat sigmoid, 1.9-2.8 mm. long, 1-1.8 mm. broad, *smooth but often deeply impressed on the somewhat flattened sides*; the strongly rounded back (in dried material) with a very low and broad obscure keel; the ventral face arching to a *rather prominent erect or slightly recurving marginal* *beak 0.2-0.6 mm. long* : *winter-buds axillary* along the branches and terminal; their fusiform bodies 9-17 mm. long, 0.5-1.5 mm. broad, the inner leaves covered by the scarious stipules, exceeded by the 3 firm spreading-ascending lower leaves.

A semi-cosmopolitan species, commonly confused with *P. pusillus* but clearly differentiated (in good material) by the slenderly tubular (instead of flat) stipules; the absence or very scant development of the lacunae bordering the midrib of the usually firmer leaves; more elongate peduncles; more elongate and very interrupted spikes; smoother, paler and usually more sigmoid and slenderer-beaked fruit, with strong tendency to be depressed on the sides; and winter-buds commonly well developed in the axils as well as at the tips of the branches. With us *P. panormitanus* extends much farther to the south than does *P. pusillus*, and it shows a very striking preference for basic or slightly alkaline (or brackish) waters, a selection of habitat noted for it in Britain by Pearsall. The species is somewhat artificially divided into two varieties:—
Larger or primary leaves 1-3 mm. wide .... Var. *major*.
Larger or primary leaves only 0.3-1 mm. wide .... Var. *minor*.

(On pp. 77-79 Prof. Fernald shows conclusively that the *P. foliosus* Rafin of our lists is incorrect. The name should therefore be deleted from my list, *B.E.C.*, 1930, 414, and from the *British Plant List*, 737/33. —Ed.)

737/23 d. ✠P. PUSILLUS L., var. d. BERCHTOLDI (Fieb.) Asch. et Graeb. Braunton, N. Devon, Dr F. R. E. WRIGHT.

737/28. P. PECTINATUS and P. INTERRUPTUS. The two following notes refer to these plants but have no other connection, as both were written quite independently. The first note is a copy of my reply to a member's enquiry as to the differences in habitat of these two forms; the second note I received from Dr R. W. Butcher some weeks later. They are interesting as being more or less complementary, and as expressing a certain parallelism of field experience, and also as suggesting directions in which further work on these plants is necessary.

I. Re your query—*P. interruptus*. According to the original description of J. A. Schultes, he meant a plant with elongated leaves and conspicuously interrupted spikes—" Die Blumen in entfernt stehenden Querlen." Babington's *P. flabellatus* is the same thing—a plant with rather long sheaths, lower stem leaves rather broad, upper ones narrower, branch-leaves very narrow; a plant of high growth, long internodes and interrupted spikes. In my judgment this plant is simply a modification of *P. pectinatus* induced by rapidly moving or deep water (*scoparius* is a shallow water form). I think the question of salt or brackish v. fresh water is much less important than the factor of moving or still water as a primary cause of the difference between *pectinatus* and *interruptus*. When you ask " Does either of these forms show any preference for salt or brackish water?"—the personal element comes in. My past 35 years' residence within five miles of the sea would compel me to say that *pectinatus* certainly does—in my experience. But I've had no similar lengthy experience near inland rivers. I know that *interruptus* is the prevailing form at Walton-on-Trent (about five miles from Burton) in Staffs—probably 80 miles from the sea—and also in the upper Severn and Thames, in all cases in rapidly moving water. *P. pectinatus* (type) abounds in still (or very slowly moving) water—canals, ponds, ditches, drains and streams near the sea, where the water is often moving but not visibly. In N. Lancs it favours ponds on calcareous rocks, often covered with a deep layer of red hematite mud. Singularly enough, there is no form of *P. pectinatus* in the pure waters of the English Lakes. *P. interruptus* is certainly the more common form in rapidly moving or deep water and I should attribute its more robust nature, longer leaves, and longer internodes to the " stretching " or strain due to its environment. As currents slow down they deposit their suspended mud or silt, so that directly associated with the factor of current will be that of mud—scanty in rapid water and abundant in still water. I am strongly of opinion that the physical nature and chemical composition of the muds or silts in which the plants are rooted is much more important than the chemical content of the water in determining the abundance and character of the aquatic vegetation. Analyses of these substrata might yield very valuable results.—W. H. PEARSALL.

II. *P. pectinatus* L. and *P. interruptus* Kit. are so closely allied that there is much difference of opinion as to whether they are distinct species, races, or merely forms of the same plant. Although the morphological distinctions are slight there are very definite differences in habitat. *Distribution.*—*P. pectinatus* is usually found in still water, in ditches, or in rivers with very limited flow. It occurs in greatest abundance in rich organic mud and is one of the characteristic plants of the slow rivers of the fen-lands and eastern England, such as the Lark and the Yare. I have collected a very robust form in dykes near the sea on the Essex Marshes, but there is no evidence to show whether the water had a high chloride content or not. *P. interruptus* on the other hand grows in two totally different types of habitat. In the first place it is common in certain fast-flowing rivers. I have seen it in the Tees at Croft, the Lea at Hertford and the Bulborne at Boxmoor (Herts). In all these places the river bed was gravel or large stones—there was hardly any mud, thus contrasting strongly with the normal places for *P. pectinatus*. In the last two rivers the water was highly calcareous, in the Tees only moderately so. The first two rivers had a normal chloride content but in the last it was somewhat high (6-7 pts. Cl_2/100,000). The second type of habitat of this plant is brackish water. The best illustration of this was Wyken Slough, near Coventry. This is a small inland pool. In July 1929 it was filled with *P. interruptus*. The chloride content of the water was 850 pts./100,000. Being in a pond, the bottom was doubtless mud, so it is at the moment difficult to see what feature there is in common between still-water habitat such as Wyken Slough and the Tees with a current of 4000 yds./hr., unless it is connected with the composition of the water. Another important point of difference between these two plants is seen in the winter. *P. pectinatus* in the Lark, though very abundant in the summer, could not be seen in the winter. On the other hand, in the Tees the area occupied by *P. interruptus* remains almost the same throughout the year and as much can be seen in the winter as in the summer.

Thus, however slight the morphological differences between these two plants may be, there is a great contrast in their habitats. It is hoped that, when opportunity arises, the validity of these distinctions will be tested by cultivation.—R. W. Butcher.

†744/5. ✠Cyperus difformis L. Bristol, W. Gloster, 1932, C. Sandwith.

†753/77. Carex vulpinoides Michx. (=vulpinoidea auct.). Avonmouth Docks, W. Gloster, 1932, J. Gibbons.

†754/9(2). ✠Echinochloa crus-pavonis. Bristol, W. Gloster, 1924, J. Gibbons. Det. Stapf.

†756/2 c. Setaria viridis (L.) Beauv., var. c. Weinmanni R. & S. Bristol Harbour, J. Gibbons.

809/. Notes on Koeleria Pers. By W. O. Howarth, M.Sc. Subgenus *Airochloa* Link consists of perennial plants, producing shoots which are sterile in the first year, then go on to flower in succeeding years.

I. Sect. *Bulbosae*: a conspicuous bulbous swelling is formed at the bases of the shoots.

Sub-sect. *Reticulatae*: by the peculiar decaying of the outermost sheaths the bases of the shoots are clothed in a mass of fibrous strands .... *K. vallesiana.*

II. Sect. *Caespitosae*: bases of shoots not bulbous; plant densely or more loosely caespitose; rhizomes sometimes semi-creeping.

Sub-sect. *Caespitosae verae*: as above, but definitely not creeping; oldest sheaths at the base usually tightly embracing the shoots.

Tribus *Cristatae*, sub-tr. *Cristatae verae*: oldest sheaths entire or irregularly lacerate, never rough; spikelets 2 to 5 flowered; lemmas muticous with either terminal or subterminal awn; ligules short. (Lemma = flowering glume = lower or outer palea).

Albescentes: culms puberulous; oldest sheaths entire or breaking into fibrous strands, pale; leaves convolute, rounded .... *K. albescens.*

Graciles: plants frequently glaucous; culms slender, usually glabrous; leaves narrow; glumes frequently narrow, lanceolate, glabrous, acute or acuminate; spikelets ca. 3 to 7 mm. long, 2 to 5 flowered; panicle lobate or cylindrical, frequently pallid .... *K. gracilis*, *K. britannica* and *K. pseudocristata.*

K. vallesiana Bertol., readily identified by the irregular fibrous masses at the bases of the shoots; radical leaves short, rigid, glaucous, with sheaths almost glabrous, setaceo-convolute; panicle cylindrical or oblong-cylindrical, continuous, not lobate; spikelets shortly pedicelled; glumes sub-equal, acute or sub-obtuse; lemmas acute or rarely acuminate, very rarely somewhat obtuse.

Var. *typica*: leaves, including sheaths, glabrous, narrow-convolute, those of culm almost glabrous, or even below the panicle minutely puberulous; panicle ca. 3 cm. long or more; spikelets ca. 4¾ to 5¾ to 6 mm. long, 2 to 4 (or 5) flowered; glumes sub-acute or somewhat obtuse-acute. Britain: N. Somerset—Uphill (Druce, 1904, 1905).

Var. *alpicola*: occasionally tall; leaves frequently less glaucous to dark green, occasionally flat (or sub-convolute towards apex), to 2 mm. broad, soft; culm laminae frequently large, and, with the sheaths, glabrous; culms densely villose, or only below panicle; panicle frequently broad, spikelets 2 to 3 flowered, glabrous or frequently pubescent.

Forma *lobulata*: panicle less dense, prominently lobed; for the rest as in type. Britain: Somerset (both the var. and the form).

K. mixta (probably *K. vallesiana* × *britannica*): about 17 cm. high; culms sub-geniculate, shortly puberulous below the panicle, at the base cylindrical, incrassate; oldest sheaths splitting into loosely woven strands; radical leaves numerous, very narrow convolute, less rigid, dark green, some flat but narrow leaves intermixed, the majority glabrous but some with dispersed short hairs; culm leaves with broad sheaths loosely embracing the stem, open above; lower ones hoary-pubescent, upper minutely puberulous; lamina flat, not rigid, green, sparsely hirsute; sheath of upper culm leaf reaches to base of panicle, lamina extends beyond its tip; panicles 4 cm. long, spikelets 5 mm. long, 2 flowered; glumes acuminate, puberulous; lemmas shortly mucronate. Britain: Somerset—Uphill (Druce, 1905), occurring with *K. vallesiana*.

K. albescens DC.: subdense or loosely caespitose; shoots frequently almost creeping; culms slender, puberulous; sheaths pallid-albescent, entire or at length splitting; leaves convolute, round; lower or all sheaths pubescent; panicle lobate and somewhat loose, or cylindrical and dense, albescent; spikelets medium long; glumes frequently sub-equal, acute to acuminate; lemmas acute, rarely sub-obtuse. The culms are 1 to 2 dm. high, leafy to mid-way, puberulous above, or just below the panicle; radical leaves 5 to 10 cm. long, 1 mm. broad; culm leaves glabrous, short lamina; ligules short; panicle 8 cm. or more long, lobed laterally; spikelets 4 to 5 (-5.5) mm. long, 2 flowered, shortly pedicellate; glumes little shorter than lemmas. Hab.: maritime sands.

Var. *typica*: tall, 3 to 6 or more dm. high; radical leaves long; sheaths more persistent; panicle large, usually more lobate, subdense; spikelets ca. 5 mm. long. Hab.: Sarnia—Jersey (leg. Druce, 1877); Dorset (9), Smallmouth Sands, Weymouth; E. Kent (15), sandy coast, Deal.

Var. *glabra*: loosely caespitose, many culmed, rhizomes more creeping, culms low, to ca. 10 to 20 cm. high, slender, puberulous; radical leaves numerous, narrow-convolute, short, 3 to 6 cm. long, rigid, glabrous, frequently curved; sheaths puberulous, glabrescent; culm leaves usually single, short, erect, 1 to 2 cm. long, convolute; panicle contracted cylindrical, dense, never interrupted, pallid, ca. 3 to 5 cm. long; spikelets small, 4 to 4.5 mm. long, glumes acute, frequently glabrous or minutely puberulous. Hab.: Sarnia—Jersey (leg. Carrol, 1862); Dorset, Chesil Beach (White, 1864); Scotland—*N.E. Fife, Pilmour Golf Links, St Andrews (Bailey, 1882).

K. albescens, var. *glabra* × *K. gracilis* (*K. superarenaria* × *gracilis* Domin, Druce in B.E.C. Report for 1905, p. 144). Stature low, 2 dm., densely caespitose; radical leaves numerous, short, curved, rigid, dark-green, setaceo-convolute, a few flat ones intermixed, scattered hairy; sheaths somewhat shortly villose to glabrescent; culm leaves with feeble lamina (many times shorter than sheath), culms villose or glabrescent; panicle short, cylindrical, below sub-lobate but dense; spikelets 2 flowered, ca. 2.5 to 4 mm. long; glumes more coloured, acuminate, more or less villose; lemmas protracted in a short awn. Hab.: Britain—Anglesey; Trefadog (leg. Griffith, 1888); Carnarvon; Bangor, sea coast, Llanfaglan Church (1882).

K. gracilis (*eugracilis*): densely caespitose, glaucous or glaucescent; culms always slender, usually glabrous or sub-glabrous, rarely pubescent; leaves frequently narrow convolute, occasionally flat and broad, glabrous to hirsute to somewhat pubescent; panicle more or less dense and frequently lobed; spikelets not usually pedicellate, usually about 4 to 5 mm. (occasionally to 6 mm.) long, 2 to 3 flowered, all glumes frequently narrow, glabrous, acuminate to somewhat acute; glumes usually shorter or slightly shorter than the lemmas.

Var. *typica* Domin: densely caespitose; culms slender and usually glaberrimous to the top, rarely minutely puberulous just below the panicle; radical leaves mostly convolute or sub-convolute, rarely flat and even then narrow (1 mm. broad), glaucous, pubescent to somewhat hirsute, somewhat rigid to rigid; sheaths pubescent or pubescent-hirsute; culm leaves with feeble lamina and sheaths as radical leaves; ligules short to almost absent; panicle pyramidal-oblong or oblong-cylindrical, loosely lobed, expanded at anthesis; spikelets fairly long pedicellate, lanceolate to linear-lanceolate, narrow, 2 to 3 flowered, ca. 4 to 5 mm. long; all glumes lanceolate to linear-lanceolate, acuminate, glabrous, glumes little shorter than lemmas; lemmas muticous. A number of habitats are given, including localities in Kent, Surrey, Middlesex, Monmouth, Dorset, Oxford, Hertford, Northampton, Leicester, Warwick, Cambridge, E. Suffolk, W. Norfolk, Northumberland, Forfar, and E. Inverness.

Var. *gypsacea* Domin: somewhat densely caespitose, culms numerous, low, ca. 1 to 2 dm. high, glabrous, radical leaves numerous, short, curved, convolute, somewhat rigid; culm leaves with feeble lamina;

panicle short, sublobate, loose, occasionally depauperate; spikelets small, agreeing with var. *typica*. Based on a specimen from Durdham Down, W. Gloster (Druce, 1879).

K. britannica Domin: rather loosely caespitose, rhizomes frequently prorepent; culms slender, pubescent, or only below the panicle; sheaths pubescent; panicle more or less lobed, not dense; spikelets small, ca. 4 to 5 mm. long, 2 to 3 flowered, pubescent to puberulous (rarely glabrous); glumes and lemmas acuminate or acute, glumes a trifle shorter than lemmas. Grows on maritime sands and sandy heaths and sometimes on calcareous hills by the sea.

The following forms are recognised:—Forma *pygmaea*: densely caespitose, panicle 6 to 8 cm. high; culms pubescent but enclosed in the sheaths; panicle oblong-cylindrical, dense, spikelets pubescent. Hab.: W. Cornwall, Rill Head, coast, serpentine rocks (Marshall, 1886). Forma *major*: tall, cr. 5 dm. high, culms pubescent, leaves narrow, soft; panicle large, lobed; spikelets large, 3 flowered, glumes at least dorsally hirsute. Hab.: Scotland—Caithness, Thurso R. (Marshall, 1886). Forma *glabriflora*: spikelets have glumes all or mostly glabrous. Hab.: with the type. Forma *glabriculmis*: culms glabrous or nearly so. Hab.: rare, with the type.

The type is reported in the following counties:—W. Cornwall (1); S. Devon (3); N. Wilts (7); E. Sussex (14); E. and W. Kent (15, 16); Surrey (17); Oxford (23); W. Suffolk (26); W. Norfolk (28); Northampton (32); W. Gloster (34); Monmouth (35); Glamorgan (41); Leicester (55); Yorkshire, N.E. (62), Mid-W. (64), N.W. (65); I. of Man (71); Edinburgh (83); Mid Perth (88); Forfar (90); S. Aberdeen (92); Banff (94); Caithness (109); Orkney (111).

Var. *brachyphylla*: less densely caespitose, low, usually ca. 2 dm. high; culms completely puberulous; culm leaves short, ca. 2.5 to 3 cm. long, glaucous, flat near sheath, ca. 2 to 3 mm. broad, narrow towards apex; panicle cylindrical, scarcely lobed, sub-dense; spikelets ca. 6 mm. long, 3 flowered; lemmas linear-lanceolate, long-acuminate, and, like the glumes, glabrous. Hab.: Wilts, near Little Langford, cretaceous rocky ground (Marshall, 1904).

Var. *aristata*: leaves mostly glabrous, green; sheaths all pubescent; spikelets 2 flowered; lemmas at the apex aristulate, awns about 1 mm. long. Not at all dissimilar from *K. albescens* in its caespitoseness and sheath characters. Hab.: on limestone, S. of Lough Mask, Ireland (Marshall, 1895).

K. pseudocristata Domin: densely caespitose; dried sheaths at base of culm collect together into an elongated covering; culms tall, to 8 dm. high; lower part robust, upper part slender, minutely puberulous below panicle, rarely glabrous; leaves usually flat, ca. 2 mm. broad, usually long, convolute, dark-green, glaucescent or glaucous, margins and nerves rough, rarely pubescent; sheaths glabrous-hirsute-pubescent; panicle large, pyramidal-oblong, not dense, generally shiny, usually more than 1 dm. long, always lobed, multispiculate, slender, long rachis and rachillae; spikelets as in *K. gracilis*, var. *typica*, except possibly larger, linear-lanceolate; glumes 2 to 3 flowered, glabrous. Hab.: I. of Man, v.-c. 71.

Var. *Nicholsoni*: less densely caespitose, dried sheaths form a thin, brown covering; culms tall, ca. 5 dm. high, glabrous, naked above; radical leaves elongated to about half height of culm, flat, narrow in part, convolute, glaberrimous, not ciliate, green; sheaths all glabrous; culm leaves not numerous; panicle long, 6 to 8 cm., lobate, dense; spikelets shortly pedicelled, large, pale, ca. 7 mm. long, always 3 flowered, 2nd and 3rd flowers long pedicelled and an elongate, glabrous sterile pedicel; glumes broad with hyaline margin, glabrous, lanceolate, more or less acuminate; lemmas lanceolate, sub-acuminate; pale as long as lemma. Hab.: Surrey—Bank of Thames, Kew (Nicholson, 1879).

824/7 c. Poa nemoralis L., var. c. firmula Gaud. Avonmouth Docks, W. Gloster, 1931, J. Gibbons.

826/1 c. Scleropoa rigida, ✠var. c. patens (Coss. et Dur.). See Rouy *Fl. France*, xiv, 292. Some years ago Lady Davy found a grass in Guernsey which appeared to be an unusual form of *Poa rigida*. It was very large, 8-10 inches high, very lax, with limp, pale green, widish curving leaves. She brought home a root and planted it in her garden, where it flourished exceedingly, always maintaining its characters. She recently showed it to Mr Noel Sandwith, who took it to Kew. There it was recognised by Mr C. E. Hubbard as above. It is well known in France but has not previously been seen from Britain or the Channel Isles and is not given in the Oxford List. Good specimens have been deposited in the Kew Herbarium. Rouy (*l.c.*) gives:—Var. *β robusta*—Plante à la fin d'un rouge brunâtre; tiges élevées (3-6 déc.), robustes; épillets plus grandes, nombreux, agrégés à la base des rameaux; panicule du type, seulement plus grande. Var. *γ patens*—Diffère de *β* (*robusta*) par: Feuilles plus larges: panicule subpyramidale, à rameaux ± étalés.

†827/1(2). ✠Bromus Gussonei Parl. Avonmouth Docks, W. Gloster, 1932, I. Evans. (*B. maximus*, var. *Gussonei* Parlat. *Fl. Ital.*, i. 407; G. et G. *Fl. Fr.*, iii, 584; Husnot *Graminées*, 70.)

†827/4 c. Bromus tectorum, ✠var. c. longipilus Borbas. Avonmouth Docks, W. Gloster, I. Evans and J. Gibbons.

828/2 d. Brachypodium pinnatum (L.) Beauv., var. d. gracile Post. Northleigh Common, Oxon, J. Chapple, Sir R. Curtis, and T. W. Southron. Det. Howarth.

†830/11. ✠Agropyrum tenerum Vasey. Avonmouth Docks, W. Gloster, 1926, C. and N. Y. Sandwith.

†835/13. ✠Hordeum compressum Griseb. (Temperate South America.) Avonmouth Docks, 1931, C. Sandwith and Gambier-Parry.

868/1. AZOLLA FILICULOIDES Lam. In the *Report* for 1931, p. 573, Mr J. G. Dalgleish credits me with the suggestion that the red pigmentation of this plant is due to shade. There is some misunderstanding here, for I have never held this opinion, and, in fact, the contrary is the case, the development of a bright red colour, presumably due to an anthocyanin compound, being associated with exposure to light, whilst when growing in shaded habitats the plants remain green. In the autumn of 1927, about three months after a handful of *Azolla* brought from Cambridgeshire had been scattered on the edge of the pond at Lancing College, the whole surface of the pond was startlingly transfigured by a brilliant red carpet which completely covered it, to the great enhancement of its beauty but to the chagrin of the farmer and the bewilderment of his ducks. In the winter the pond flooded over into the neighbouring dykes and all the *Azolla* vanished from its surface, only to spread rapidly along the drains, where it grew so densely as on occasion to mislead the unwary into stepping incautiously on to what looked like *terra firma*, with distressing results! It never again flourished to the same extent on the pond, though scattered plants were to be seen at its margins in subsequent years. The plant is abundant and very luxuriant on the Chichester Canal in West Sussex, and I saw it last August (1932) on the marshes near Sandwich in East Kent. It thrives best in shallow water with a muddy bottom into which the roots penetrate. When freely floating like *Lemna* the plants are small and much less luxuriant than when rooted in mud rich in organic matter. Although *Azolla* makes quite a successful subject for water-culture experiments in the laboratory, I have never managed to keep it alive for more than about a year indoors, possibly because of insufficient light intensity or lack of decomposing vegetable matter for it to root in. Where mosquitoes are a nuisance this plant might be introduced, as a thick carpet of *Azolla* covering the surface of a ditch or pond must make it difficult or impossible for these insects to breed. A. E. ELLIS.

Extracted from *The Journal of Botany*, 1932.

†176/33(2). ✠VICIA CASSUBICA L., recorded from Greenhithe, E. Kent, v.-c. 15, by Mr F. Druce in *J.B.*, 52, 1932. Wide distribution in Europe.

185/13(2). RUBUS MONENSIS Bart. & Ridd. in *J.B.*, 107, 1932, replaces R. LAETUS W. Wats., which is inadmissible on account of R. LAETUS Progel, 1882. Anglesey, Merioneth, and Carnarvon.

185/67(2). ✠RUBUS SURREJANUS Bart. & Ridd. in *J.B.*, 188, 1932. W. Sussex, Surrey, Oxon.

✠Var. b. WEALDENSIS Bart. & Ridd., *ibid.* W. Sussex.
✠ × RHAMNIFOLIUS, *ibid.* Surrey.
✠ × FUSCUS, var. NUTANS, *ibid.* Surrey.

185/67(3). ✠RUBUS PURBECKENSIS Bart. & Ridd., *ibid.* Dorset, S. Hants. Teste BARTON and RIDDELSDELL. The name *leucanthemus* should be deleted from the *List*.

†416/3(2). ✠CREPIS OPORINOIDES Boiss. Spain. Recorded from Isle of Wight and N. E. Yorks by Dr E. Drabble in *J.B.*, 207, 1932. *Ibid.* p. 274, Dr Drabble describes the differences between this species, *C. nicaeensis* Balb., *C. capillaris* (L.) Wallr., var. *anglica* Druce and Thellung, and *C. biennis* L. This species is most closely related to the last of these, from which it differs in its nearly glabrous stems, more open and branched habit, non-auricled nearly glabrous leaves, and longer fruits; it is biennial.

463/2 c. LYSIMACHIA VULGARIS L., var. c. MACULATA Dr., appears to be antedated by var. *Klinggraeffi* Abromeit in *Phys.-Oek. Ges. Königsberg*, xxxii (1891), 71, C. E. Britton in *J.B.*, 333, 1932.

517/2 g. ✠SOLANUM NIGRUM L., var. g. CHLOROCARPUM Spenn. Recorded from Surrey, C. E. Britton in *J.B.*, 334, 1932. Is this possibly the same plant as var. b. of the List *luteo-virescens* (Gmel.)?

615/13(2). ✠POLYGONUM OXYSPERMUM Mey. et Bge. Identified in the Stockholm Herbarium by Prof. Samuelsson, from Gosfort, Haddington, v.-c. 82; also in Herb. Mus. Brit. from Forfar, v.-c. 90. and probably Redcar, N.E. Yorks, v.-c. 62 (Foggitt). Close to *P. Raii* Bab. from which it differs in having long internodes, the ochreae on the larger branches being only one-fourth to one-fifth the length of the internode, laminae linear to narrowly lanceolate, acutate not obtuse. nut olivaceous or pale brown, inflorescence redder and perianth segments not overlapping. Gatherings of *P. Raii* from Arran and Galway may be sub-sp. *norvegicum* Samuelsson. A. J. Wilmott in *J.B.*, 83, 1932.

718/3 c. ✠JUNCUS CONGLOMERATUS L., var. c. SUBULIFLORUS (Drejer). Wisley, Surrey, C. E. Britton in *J.B.*, 336, 1932. Cymes lax, compound, lateral branches elongated, bearing smaller cymes, capsules abrupt, retuse, mucronate.

766/2. ANTHOXANTHUM PUELII Lecoq & Lamotte is the correct name of the British Plant. *A. aristatum* Boiss. differs in its shorter stems, unbranched or branched only at the base, and dense, ovate, shorter spike with longer, much exserted awns, and is not known to occur in Britain. W. T. Stearn and J. S. L. Gilmour, Notes from the University Herbarium, Cambridge, Supplement to *J.B.*, 1932, p. 1.

827/19(2). BROMUS LEPIDUS O. R. Holmberg in *Bot. Notiser*, 1924, 326, antedates *B. britannicus* I. A. Williams, 1929. *B. gracilis* Krösche, 1924, is also identical but the name is not admissible. STEARN and GILMOUR, *l.c.*, p. 3.

NOTES ON PUBLICATIONS, NEW BOOKS, ETC., 1932.

BIOLOGY—AN INTRODUCTION TO THE STUDY OF LIFE, by Prof. H. MUNRO FOX. Cambridge University Press, 1932; xiv + 343 pp. Price 6/-. Great Britain is at present the only important country in Europe in which some biology is not taught to everyone at school, but the tide seems now to be turning, and the study of biology is being introduced every year into more and more schools. This book is primarily designed to meet the need of such teaching, but the book also provides a most attractive outline of biology for those of more mature years who are not studying for any examination. Many people commence the study of nature on their own account and it very soon becomes a most fascinating hobby. To all such this book can be most highly commended. Of its 343 pp. about one-third deals directly with plants and is exceptionally interesting, thought-compelling and valuable. Other subjects are included in the contents—a chapter to each—Life and Energy, Respiration, Blood, The Frog, Protoplasm and Cells, How Green Plants Feed, Colourless Plants, The Lower Green Plants, Hydra and Worms, Insects (with an arresting article on Bees), Flowers, Fruits and Seeds, Germination and Growth, Buds and Bulbs, The Animal Kingdom, Growth and Death, Instinct and Reason, Fossils, Evolution, The History of Biology.

My first reaction upon opening the book was that of gratification at the number (152) and excellence of its illustrations. They are of admirable choice and far above the usual level of interest and value. Another commendable feature is the reduction of technical terms to a minimum and the emphasis given to the value of the study of plants and animals in their natural habitats. We consider the book worthy of high praise.

MONOGRAPH AND ICONOGRAPH OF NATIVE BRITISH ORCHIDACEAE, by Col. M. J. GODFERY, with 57 coloured plates from water-colour drawings of living plants by Hilda M. Godfery. Cambridge: at the University Press, 1933. £7 7/- net. No monograph of British Orchids with coloured plates has hitherto been published and the descriptions in our Floras are necessarily brief, inadequate, and largely out-of-date. The need for a modern and exhaustive account of these plants has therefore long been felt.

The very high scientific value of Col. Godfery's work upon this Natural Order has long been realised and the exhibition of his late wife's exquisitely beautiful coloured drawings had combined to arouse the keenest interest in the completion of this volume, and its publication has therefore been eagerly awaited. I am compelled to say, at the outset, that its content and presentation exceed my highest expectations. Only the closest collaboration of scientist, artist, and craftsman —each imbued with the loftiest aim—could have produced such a sumptuous volume as this.

It is not a compilation, but is based upon original observations of living plants, studied year after year in their natural habitats in many localities, both at home and abroad. It is not confined to descriptions, for the biological as well as the taxonomic side has been taken up, the aim being to record everything of interest, and to give a clear conception of the plants as living organisms. The drawings are botanically accurate and most of them were included in 186 water-colours shown at the Royal Horticultural Society's Exhibition in London in 1925, which were awarded the Society's Gold Medal. They also formed part of 229 drawings exhibited at the Fifth International Botanical Congress at Cambridge in 1930.

No better expression of the true scientific spirit in which the work is conceived could be found than one of the opening sentences: "Orchids are perhaps the most elusive of all flowering plants, and many a theory tentatively advanced or dogmatically laid down has been proved by time to be erroneous. One must enter the shrine of their closely guarded secrets with an open mind, ready to discard the most cherished preconceived ideas, if necessary."

The work is arranged to indicate the trend of evolution from the more simple and ancient types to comparatively recent and more specialised forms, and the two chapters on the Evolution of the Orchis are fascinating in the extreme. The descriptions and illustrations were made from living plants not only British but continental, watched and studied year after year in widely different habitats. They reach an exceptionally high standard and will be invaluable for the further study of these plants. We are pleased to note that in the adequate details of distribution no exact localities are included. Other chapters deal with (iv) Pollination and Fertilisation, and (v) The Life of an Orchid, and are of great value.

There is a Popular Key to the Sub-families and Genera, and also detailed Keys to the Species of each Genus. The book is well-indexed and contains copious bibliographical references where they are most useful, at the foot of the page whereon each reference is cited.

We heartily congratulate Col. Godfery, his collaborators, and the Cambridge University Press upon the production of a volume of such supreme scientific and artistic value—a great and memorable achievement.—W.H.P.

MEN OF THE TREES, by RICHARD ST BARBE BAKER, with a foreword by Bronislaw Malinowski and an introduction by Lowell Thomas, with photographic illustrations. London, George Allen and Unwin, Ltd. Price 12/6 net. After reading this fascinating volume I was tempted to wish that I had control of a fund ample enough to enable me to provide a copy for every legislator, botanist, teacher of geography and secondary school library in the country. The author of this book has devoted his life to the planting and preservation of trees, and this is an account of his personal experiences during eight years in the Mahogany Forests of Nigeria and in the Highlands of Kenya. It is the story of one of the only two white men who have ever been admitted with full rites and ceremonies as a blood brother of the native tribes. It is alive with the magic of the powerful religion of the black man, with savage dances, fights to the death, the impassioned struggle of the tribesmen against the encroaching desert, and permeated throughout with the philosophy of the trees.

Bronislaw Malinowski, Professor of Social Anthropology, London University, says of it: "The account of the mystic rites which centre round trees is almost worthy of some of the most attractive pages of the *Golden Bough*. Only a real tree worshipper . . . . could have entered with such an intuitive grasp of reality into the ritual life of these unknown people. Read the chapter on the secret of Kiama, and you will be brought nearer African Sociology than after perusing volumes of learned disquisitions. Follow the dancing on the Equator, so vividly described, and you will understand why rhythm and song and the music of words appeal to the African; you will understand how, if you wished to lead him, you would have to go about your business."

Lowell Thomas says: "As for this book, it is thrilling, full of strange lore, strange lands and the primitive peoples of the tropic forests."

I venture to suggest that any of our members who secures a copy of *Men of the Trees* will endorse the opinions herewith expressed.

W. H. P.

THOMAS JOHNSON, botanist and royalist, by H. WALLIS KEW and H. E. POWELL, with illustrations. Longmans, Green & Co., London; 1932. Price 8/6 net. Among those whom we rightly regard as the fathers of British botany Thomas Johnson occupies a very prominent place, but later generations have not been sufficiently grateful to his memory, mainly because no previous comprehensive and adequate account of him has been compiled. Most writers on the period in which he lived (c. 1600-1644) have turned to Pulteney's *Historical and Biographical Sketches of the Progress of Botany in England* (vol. i, 1790) for their information, but although an admirable and accurate author, Pulteney failed, in matters of great importance, to assign to Johnson his proper degrée of merit. Unfortunately, his statements have continued to reappear in books for more than a hundred and forty years. Hence the necessity for some review of this kind which may restore to Johnson the position in British botany which should all along have been accorded to him.

"It was undoubtedly by his *Gerard* that his reputation was established, but the most important of his works was the *Mercurius Botanicus*, 1634-1641, which was published in two parts. This was the first British Flora; the first work in which the then known British plants were enumerated; separated from those of the Herbals; and dealt with alone." Most authors have followed Pulteney in assigning to How's *Phytologia* the historical position just indicated; but the *Phytologia* is the later work (1650) and (as Clarke pointed out as long ago as 1897) "in the main a verbatim reprint" of the *Mercurius* catalogues.

This is merely one example of the authors' treatment, and it is supported by the most exhaustive and convincing detailed references. British botanists will be grateful to the authors of this most interesting and valuable volume for their success in making clear and certain much that was formerly obscure or doubtful in regard to Johnson and his contemporaries.—W.H.P.

BRAUNTON: A few Nature Notes, with lists of Flora, Macro-Lepidoptera, and Birds, by Dr F. R. ELLISTON WRIGHT. Revised edition, 1932. Published by A. E. Barnes, Barnstaple. This is a charming book and will surprise and delight any lover of Nature who acquires it. The text is of exceptional interest and presents accurate scientific knowledge in a most thought-compelling and arresting manner. In this it is aided by many original and valuable illustrations. A book to be unreservedly and very strongly recommended to discerning people.

THE MEDICINAL AND POISONOUS PLANTS OF SOUTHERN AFRICA: An Account of their Medicinal Uses, Chemical Composition, Pharmacological Effects in Toxicology in Man and Animal. By JOHN MITCHELL WATT, M.B., Ch.B., and MARIA GERDINA BREYER-BRANDWIJK. Large 8vo., pp. xx, 314, 26 pls. (12 in colour). E. & S. Livingstone, Edinburgh; 1932. Price, 25/-. This is an arresting volume, alike as an excellent example of the printer's art and as a remarkably exhaustive source of information upon the subjects with which it deals. The aim of the authors " has been to give all the available information on the medicinal uses, chemical composition, pharmacological effects, and human and veterinary toxicology of the flora of Southern Africa." As they say, " it forms an amazing record," and should give an impetus to such work and prove a stimulus to the great body of medical practitioners in Southern Africa to record cases of plant poisoning which come their way. We hope, too, that the pharmacist, the missionary, the forensic worker and the scientist will find it of value in their several spheres. There are four indexes, giving the botanical names of the plants, the common names from European languages, the native names and the names of active principles. These are the more necessary as it is assumed that those using the book have first ascertained the name of the plant concerned. At the end of each section the authors give a very complete list of particular references to works consulted, and in an Appendix a list of the general publications to which reference has been made and instructions for reporting on reputed cases of poisoning or for sending in specimens of suspected material.

THE MECHANISM OF CREATIVE EVOLUTION, by C. C. HURST, Doctor of Philosophy of the University of Cambridge, with a Frontispiece and 199 Figures. Cambridge University Press, 1932. Price 21/- net. The new science of genetics has confirmed and extended Darwin's law of natural selection and Mendel's laws of heredity, both experimentally and mathematically. One of these extensions is the genetical delimitation of species, which has enabled us to place the study of creative evolution and its natural adjunct, taxonomy, on the experimental basis of an exact science. The discoveries of the chromosomes and genes and their inter-relations prove to be as important to the biologist as the discoveries of the atoms and electrons and their inter-relations are to the physicist.

For genetical biology a verbal definition is inadequate and it is necessary that there should be a quantitative and qualitative measure of creative evolution which can at any time be submitted to the test of genetical experiment. Recent work shows that in the genetical species we have such a unit which, though not entirely free from objection, is probably the most useful one available in the present state of knowledge. Since the time of Darwin the "good" taxonomic species has been used as a rough and crude measure of evolution, but experience teaches that this is a concept too vague and subjective to be used as a measuring rod of precision in a scientific age. The genetical species proves in general to be a considerably larger unit than the ordinary Linnean species, being in many cases equivalent to a generic section or a sub-genus. It is measurable in terms of chromosomes and genes and consequently can at any time be precisely determined and tested experimentally.

The chromosomes in each species are remarkably constant in number, size, and shape (except in their polyploid varieties, which are incipient species). This discovery is vitally important to the systematist and taxonomist, since the specific rank of any individual can now be definitely established by means of a critical and experimental examination of its chromosomes and characters and the time is not far distant when these experiments will be regarded as the only true criteria of the systematic position of a plant or animal and a new exact science of taxonomy established on an experimental basis.

The gene is the unit of life and the genetical species is the unit of creative evolution. The far-reaching importance of these vital units to mankind can hardly be overestimated, since the genes are not only the basis of all structural and functional characters but, as recent work indicates, they are also the foundation of human thought and action.

"It is evident," writes the author, "that as a result of these discoveries a critical period in human history has arrived. Man, if he chooses, can, here and now, take a hand in creative evolution by creating new species of living organisms and replacing natural selection by human selection. For a thousand million years natural selection, as one of the processes of creative evolution, has dominated life, and for ten million years it has dominated the human mind, obsessing man with the idea of an over-ruling fate. Scientific research has brought freedom to man and the future trend of creative evolution, including man's own destiny, depends entirely on his response to the new knowledge and on his intelligent application of these discoveries in the near and distant future."

The author of this arresting volume is an accepted authority and has given us a scholarly presentation of the most recent researches in the genetics of plants and animals. The type is singularly clear—as is the

English it conveys—and the illustrations are both numerous and valuable. The book should occupy a prominent position on the library shelves of all British botanists.—W.H.P.

CHROMOSOMES AND PLANT-BREEDING, by C. D. DARLINGTON, Ph.D., D.Sc., with a Foreword by Sir Daniel Hall, K.C.B., F.R.S. London: Macmillan & Co., Ltd., 1932. 7/6 net. The author's purpose is to set out the recent developments in the study of chromosomes and to point out their bearing on the practice of plant-breeding. Science in these matters has been advancing at such a pace that all students will be glad to have the records of recent research gathered together and presented as a whole. It is now necessary for the practical hybridist and plant-breeder—even the amateur who wishes to improve his favourite plant—to make himself acquainted with the chromosome basis of the theory of heredity. Not only to such practical horticulturists, but to botanists generally, this book should be a great boon, and is strongly recommended.

FLORIDA WILD LIFE: Observations on the Flora and Fauna of the State and the influence of Climate and Environment on their Development. By CHARLES TORREY SIMPSON; The Macmillan Company, 1932; Price 12/6 net. A book of absorbing interest to any naturalist and also eagerly read by those whose literary appetites are jaded. The wonders of tropical life are here presented by a writer with first-hand knowledge derived from long residence in Florida and who can call to his aid a rich store of botanical and ecological knowledge, and drive home his points by an extremely fine series of excellent photographs. As a result we get a volume which it is difficult to put down and to which we eagerly return at the first opportunity. Limitation of space prevents me from quoting from its fascinating pages, although I had marked many for the purpose—*e.g.*, pp. 63-4, where we get a most graphic account of several species of *Utricularia* found growing among the tree-tops!

ENGLISH NAMES OF OUR COMMONEST WILD FLOWERS. Arranged and Explained by ROBERT FISHER, M.A., Canon of York. Arbroath: T. Buncle & Co., Market Place, 1932. Price 6/-. Anyone who takes an interest in our Wild Flowers often finds a difficulty owing to the number and confusion of their English names. Most plants have more than one name (Herb Robert has over 120), and the same name is often used for several different plants. In the 250 pp. of this excellently-printed volume Canon Fisher has dealt with between 16,000 and 17,000 English plant names and has arranged them alphabetically to facilitate easy reference. He has also added the meanings of the names and these are of the greatest interest. To quote a well-known writer on Wild Flowers, "Let no one think lightly of their common names, for much treasure may sometimes be found hidden under a rough expression or name." This is perfectly true and the writer of this review has found much gold beneath the dust in searching among its pages. The English names often suggest where to look for the plant or give some characteristic feature by which it may be distinguished. They are also frequently associated with our literature, history, industries, health, religion and other features of our national or local life and throw much light upon them. References both to writers and to localities are given where further information may be desired, either as to the meaning of a name or in connection with it.

Of course, there is no suggestion of dispensing with the use of the Latin or Botanical names. These are absolutely indispensable standard names for the common use of botanists living in many countries and speaking different languages. With each English name, therefore, the Latin name also is given. The book is the most comprehensive list of English names we have met with and represents an enormous amount of labour and critical research. It is a most valuable book of reference to which we wish unqualified success.

CHALK STREAMS AND WATER MEADOWS, by Dr E. A. BARTON. London: John Murray, Albermarle Street, W. Price 7/6 net. I cannot imagine why the publishers should send me this volume for review, but as a lifelong fly-fisherman I rose eagerly to the lure of it and found it of absorbing interest. The study of Botany and Entomology are complementary to the practice of the fly-fisher's art and fortunate indeed is the man who combines them.

Dr Barton is as well known as a fisherman as he is a writer and photographer of the scenes in which fishermen delight. He has now, at the request of many friends, gathered together a number of his prose pieces and poems, and in this volume they are issued for lovers of the delicate art they celebrate, together with twelve photographs specially selected by the author from his collection.

The literary charm of this volume is quite exceptional and not only fly-fishermen—who *must* procure a copy—but all lovers of nature will find it a great treat.

AN ACCOUNT OF THE SEMPERVIVUM GROUP, by R. LLOYD PRAEGER, D.Sc. The Royal Horticultural Society, Vincent Square, London, S.W.1, 1932. Price to non-Fellows, 21/-. In prefacing an account of the genus *Sedum* a few years ago (*Journal R.H.S.*, 46, p. 1, 1921) Dr Praeger stated that " It is doubtful if any genus of plants which is widely cultivated is in such a confused state in our gardens and horticultural books as is the genus *Sedum*." Even greater confusion exists in regard to the genus *Sempervivum* and both gardeners and botanists will welcome this admirable and exhaustive treatment of its various species and forms. The author shows that much of the existing confusion in gardens is due to the gardeners' practice of distributing *seed* —which in this group is seldom pure—instead of *offsets* or *cuttings*, which are freely produced, very tenacious of life, and can be despatched long distances without loss.

Another source of error, in this instance among botanists rather than gardeners, arises from the difficulty of drying these very succulent plants. Much herbarium material is of little assistance in the naming of species, for this reason. In such circumstances, living material, full descriptions, comparative notes and excellent figures have been used as aids to the greatest possible extent. In the systematic treatment keys are supplied, synonymy is given with exceptional fullness, references are adequate, the descriptions are of the greatest scientific value and are supported by a large number of very fine figures. This volume is a comprehensive and scholarly account of a genus of plants easily cultivated and of great interest. Although mainly intended for gardeners, it is equally valuable to botanists, and should be highly prized by each.

THE FANTASTIC CLAN—THE CACTUS FAMILY, by JOHN JAMES THORNBER, A.M., Professor of Botany, University of Arizona, and FRANCES BONKER, 1932. Macmillan & Co., Ltd. Price 18/- net. An intimate acquaintance with the weird and beautiful plant life of the great desert tracts of sunny California and South-western Arizona has enabled the authors of this engrossing volume not only to give us a vivid word-picture of the wondrous beauty of these desert creations in their native haunts, but also to explain to us how to identify the various species of Cacti, and how to grow them in our gardens or greenhouses.

The descriptions of the various species in their natural habitats are of profound interest and are illustrated by fine photographic and coloured plates. Even the casual or indifferent reader must be thrilled by the graphic account given of the Night Blooming Cereus (*Cereus Greggii*) " for only one night in each year does it come forth into bloom, scenting the warm sweet air of the desert land for miles and miles with poignant fragrance."

After reading the book we believe that many will desire to have a cactus garden of their own and to add to their pleasure in following the excellent advice the volume gives as to culture.

THE LINEAR-LEAVED NORTH AMERICAN SPECIES OF POTAMOGETON, by Prof. M. L. FERNALD. Memoirs of the Gray Herbarium of Harvard University, III. July 1932. To students of the genus *Potamogeton* the publication of this excellent and exhaustive monograph is an event of outstanding importance. To British workers in a more restricted area it has always been a matter of surprise and regret that, with the exceptional facilities afforded by the great lakes and waterways of North America, no adequate attempt has previously been made by an American to critically study their Pondweeds. However, this reproach has now been removed, and we heartily congratulate Prof. Fernald upon the thoroughness, accuracy, and scientific value of his work. In our judgment the volume before us is superior in many ways to any existing account of the Potamogetons of this section. The author avoids the danger of over-emphasising the importance of anatomical characters and the undue multiplication of names for trifling morphological variations, which detract so much from the value of Hagström's *Critical Researches.* His descriptions are singularly accurate and complete, the ecological notes invaluable, and the 40 full-page photographs of plants and their parts must have involved an enormous amount of most careful preparation. The work opens with a review of the American literature, which is shown to be both meagre and untrustworthy. The only original American monograph covering *Potamogeton* is Morong's Naiadaceae of North America (*Nem. Torr. Bot. Cl.*, iii, 2, 1893). Morong was largely influenced by the American, James W. Robbins, by Alfred Fryer and Arthur Bennett, and by the great Swedish specialist, Tiselius. His work was conservative and sound for its time but " the prevailing and highly erroneous conception that the species of hydrophytes are of more general range over the world than are terrestrial species perhaps blinded Morong, as it still does many others, to fundamental differences of stipules, leaf-structure, flowers, and fruit which clearly separate various North American species from their superficially similar European representatives. For instance, Morong (and all who have followed him) accepted the European *P. lucens* L. as North American, but with the comment that ' the remarkable forms, so common in Europe . . . . never occur in our country;' apparently without suspecting that the reason is that in all essential characters (leaf-margin, venation, peduncles, flowers and fruit) the American plant is unlike the European and is apparently a separate species. Similarly, the Old World *P. perfoliatus* L., in America a decidedly northern species, was made by Morong to include the more southern and endemic American *P. Richardsonii* (Ar. Benn.) Rydb. and *P. bupleuroides* Fern., species subsequently separated; while the European *P. alpinus* Balbis was made to cover the American and eastern Asiatic *P. tenuifolius* Raf., a species with strikingly different fruit which was clearly described by Alphonso Wood in 1847 but ignored by his contemporaries and successors until 1930."

Prof. Fernald next proceeds to deal with the influence of foreign authors upon the nomenclature of these American plants. " Perhaps as voluminous as any notes on North American Pondweeds have been the writings of the late Arthur Bennett, whose early work was apparently careful but who, in his later years, put many of his studies into print while they were still rudimentary or only half-formed and too often without checking or careful proof-reading. With vague understanding of many of our plants and of our geography and writing in a contradictory and unfinished style, Bennett often produced confusion rather than clarity in the working out of American Pondweeds. Lest it be felt that this criticism is unjust or unkind, attention may be called to the contradictory or careless work of Bennett discussed after the synoptic treatments of *P. Hillii*, *P. obtusifolius*, *P. pusillus*, etc. I there raise the question, whether wholly impossible descriptions, which in no crucial point describe the material at hand, should be accepted as valid publication: for instance, *P. Aschersonii* Ar. Benn., one of the Pusilli, is described by Bennett as having ' linear ' leaves ' ½ in. long, 1-1½ in.

broad ' and ' Fruit 2½ lines by 1½ in. broad,' whereas the material he had before him has truly narrowly linear leaves, and fruits 2.2-2.8 mm. long, by 1.4-1.8 mm. broad! Bennett was often more impressed with intangible and undefinable habital characters than with fundamental differences in the flowers and fruits. Thus there grew up what I have called the impressionistic treatment of species. This psychological rather than morphological separation of plants is well illustrated by Bennett's account of his *P. Sturrockii* as ' Whole plant delicate, pellucid, and not conforming to any named *pusillus*, but standing apart,' or his description of a reputedly new variety of *P. pusillus* as having ' the heads of flowers at a short distance looking as though they are elevated above the plant without any peduncle.' The inevitable result has been that any pusilloid Pondweed with pellucid leaves and ' standing apart ' from the collector's vague conception of *P. pusillus* has, in America, been erroneously called *P. Sturrockii* or *P. pusillus*, var. *Sturrockii*."

In 1916 appeared Hagström's *Critical Researches on the Potamogetons*. " This was the most thorough classification of the Pondweeds up to that date put forward, and although Hagström laid altogether too much weight on anatomical characters and proposed preposterous hybrids (of hypothetical parents thousands of miles apart) he gave by far the best basis yet proposed for the classification of the linear-leaved species."

The next chapter is devoted to Diagnostic Characters and is eminently sound and reliable. The author finds that many species of *Potamogeton* fruit only at long intervals and cites our sub-sp. *lacustris* in support of this view. He further says, " The Pondweeds of the subgenus *Eu-potamogeton* are wind-pollinated "—citing Ascherson, Rendle, and Hagström in support. Apparently he accepts this view unconditionally for he afterwards proceeds to use it as the premise of some of his arguments (*e.g.*, p. 18). Judging by our own lengthy field experience in the English Lakes, the statement needs modification. Our sub-sp. *lacustris* (of *P. pusillus*) never reaches the surface to flower, even upon those rare occasions when it produces fruit, and therefore must be pollinated under water. Not only so, but we have repeatedly dredged up fine fruiting specimens of *P. obtusifolius* from colonies not visible at the surface—the tops of the plants being possibly 2 ft. below, in slightly peaty water. However, this point can scarcely be adequately dealt with in a review and will be more fully discussed elsewhere. We share Prof. Fernald's opinion that winter-buds often furnish very useful diagnostic characters and our experience strongly supports his view that even in such heavily-fruiting species as *P. Friesii* these hardened and abbreviated branch-tips are the usual, if not the only, means of reproduction.

" The point here raised, that freely fruiting members of the *Compressi*, *Pusilli*, and *Javanici* seem to propagate chiefly if not solely by winter-buds, should be experimentally checked. Herbarium specimens by the thousand and the best illustrations indicate that their reproduction is wholly vegetative. If the fruits of these species, often produced in great abundance, are, indeed, not viable, the fact is of great significance. At present no experimental evidence on this point is available."

A synoptical treatment of the American linear-leaved species occupies the next 100 pp. This is naturally one of the chief features of the book and is worthy of the highest praise. Each species is given an extremely full, detailed, and accurate description, an ample synonymy, and a map showing the distribution (which is also given in detail below). Much of this, of course, refers to species unknown in Britain, but under *P. Friesii* we are pleased to find further support for our adoption of this name (*Rep. B.E.C.*, 1929, 150) as against that of *P. mucronatus* Schrad., which both Hagström and Druce retain. "The name *Potamogeton mucronatus* Schrad., maintained by many European botansits, has no nomenclatural status. It is said to start in Roem. and Schult., *Syst.*, iii, 517 (1818), but its publication there was simply as an unidentified *nomen nudum*; Roemer and Schultes, at the end of the treatment of *Potamogeton*, appending two unknowns, one of them 'Quid *P. mucronatus* Schrad.' That, of course, gives the name no status. It is next cited as dating from Reichenb. *Icon. Fl. Germ. Helv.*, vii, 15, t. xxiv (1845); but Reichenbach definitely maintained for the plant the name *P. compressus* and appended as a synonym '*P. mucronatus* Schrader, R.S., iii, p. 517!' Here, again, the name *P. mucronatus*, taken up merely as a synonym, fails of valid publication; and it should give way to the properly published *P. Friesii* Rupr. (1845)." Under *P. obtusifolius* we are given a detailed account of the plant (No. 1357) collected by Mr D'Urban on August 18, 1921, in the Double Lock, Exeter Canal, and identified by Bennett as the American *P. foliosus* Raf. Subsequently, much imaginative explanation of its introduction here was written to support this view, but it is perfectly clear that the name is untenable and must be deleted from our lists.

Prof. Fernald's treatment of *P. pusillus* is exceptionally full and extremely valuable. It so entirely agrees with our own conception of the species that it is a matter of regret for us to be unable to accept the classification of our sub-sp. *lacustris* under the var. *mucronatus* (Fieber) Graebner.

We discarded Fieber's name *mucronatus* because neither his description—"Blätter stumpf, mit feiner Haarspitze"—nor his figure applies to our plant. The latter is quoted by Fernald (p. 92) and is compared with that of *P. lacustris* in Butcher and Strudwick, which is almost exactly similar but unfortunately does not correctly represent the leaf-apex of our plant. Both figures have the same fundamental defect—the *apex tapers to the tip*. In sub-sp. *lacustris* there is no such taper (the apex being practically semi-circular), and in our original description (*Journ. Bot.*, 1921, 164) we specifically gave "not tapering above, apex very rounded—obtuse, usually more so than in *P. obtusifolius*." We still regard this as the earliest published account of any similar form and therefore the name sub-sp. *lacustris* should stand. So distinct is the plant that several British botanists would give it specific status, but to this we cannot agree. However, we entirely agree with Prof. Fernald (p. 92) that " there is, surely, a real biological distinction between the round-tipped variations and those with tapering or acute leaf-tips." Our only divergence of opinion has reference to the choice of the name *mucronatus*, which has been so variously conceived as to be confusing.

As illustrating Prof. Fernald's great difficulty in " straightening out " the American pondweeds and the very thorough manner in which the task has been discharged we cannot do better than quote a specimen page (93). " As the typical *P. pusillus* (var. *typicus*) I have followed Fieber, Fries, Graebner and Hagström in selecting the plant with subacute to sharply pointed leaves and well-developed lacunar system. In regard to var. *tenuissimus* M. & K., Dr G. Fischer maintained that Mertens and Koch had a slender *P. panormitanus* (in view); so he substituted the name *cuspidatus* (1907). As Hagström points out, however, there is nothing in the account by Mertens and Koch to indicate that their plant was not a very slender *P. pusillus*, as usually interpreted. If the name *P. pusillus*, var. *tenuissimus* is found to belong to a form of *P. panormitanus*, as Fischer maintained, there is another varietal name earlier than var. *cuspidatus* (1907) to be reckoned with. This is the ill-begotten *P. pusillus*, var. *capitatus* Ar. Bennett (1901). As briefly as possible, the situation may be stated as follows:—In 1890, Bennett, aiming to name a specimen from Spallumacheen River, British Columbia (coll. J. M. Macoun, 1889), called it *P. pusillus*, ' var. *elongatus* Bennett, M.S.,' giving little if any diagnosis and involving the typification by interpolating notes on a plant from Hungary (see Macoun, *Cat. Canad. Pl.*, pt. v, 371). In 1891 (*Journ. Bot.*, xxix, 151) in one of his own papers, Bennett described the same plant more formally as var. *elongatus*, but still interpolated comments about the Hungarian specimen. From the formal citation, however, it would seem that the Spallumacheen River plant—which is very characteristic *P. panormitanus*—must stand as the type of *P. pusillus*, var. *elongatus*. Ten years after being cited formally as the type of var. *elongatus*, the same plant figured (*Journ. Bot.*, 1901, 201) as part of another of Bennett's varieties: ' *P. pusillus* L., var. nov. *capitatus*. This was sent me by Prof. Macoun from Sable Island, and I have also specimens from the Spallumacheen River, British Columbia, 10/7/1889, leg. J. M. Macoun, which I have wrongly referred to my var. *elongatus*.' Just why ' wrongly ' does not appear, since the Macoun plant was the type of var. *elongatus*. The Sable Island plant (our Plate 17, fig. c), which I have studied in Bennett's herbarium at Kew and in fuller material in the Canadian National Herbarium and the Gray Herbarium, is very characteristic var. *tenuissimus*, as currently interpreted, though another Sable Island number of Macoun's is nearer to var. *mucronatus*. In describing var. *capitatus* from Sable Island, Bennett said: ' The fruit-stems [whatever they may be] approach in character those of my *P. Aschersonii* rather than the usual form of *pusillus*,' thus starting further complications for the Sable Island plant.

In 1893, Bennett had published a new species from South America, *P. Aschersonii* (*Journ. Bot.*, xxxi, 294), said to have affinity with *P. pusillus*, but to have ' linear ' leaves ' 1-3 in. long, 1-1½ in. broad . . . . Fruit 2¼ lines by 1½ in. broad.' Obviously, no plant with leaves 1-1½ inches broad belongs to the *Pusilli* and the fruits, described as being as broad as walnuts, are quite impossible for any pondweed. Whether such an ill-described species can be considered as legitimately published is an open question, but Graebner took it up in *Das Pflanzenreich*, with the leaves described as ' 2.5-4 mm. lata,' the fruits ' 4.5 mm. longi, 3 mm. lati '; a description, it should be noted, which is a liberal translation into their metrical equivalents of Bennett's measurements (changing inches to lines). Hagström, on the other hand, said with apparent conviction, ' *P. Aschersonii* belongs to the comparatively small species of this group. . . . The leaves are narrow, 1.5-2 (-3) mm. broad,' but he seems not to have seen the fruits and merely to have assumed that even the revised measurements given by Graebner are much too large. The important point for us is, that Hagström cited *P. Aschersonii*, not only from South America and Cuba, but from ' Canada, New Foundland, and Sable Island—Macoun (hb. Haun.).' Not only did Hagström so identify the Sable Island plant, the type of *P. pusillus*, var. *capitatus*, but Bennett, who, one might suppose, ought to have known his own South American *P. Aschersonii*, capitulated, saying in 1927 (*Journ. Bot.*, lxv, 116) ' *P. Aschersonii* A. Benn. This Chilian and S. American species is recorded by Hagström from Sable Island, Canada, and Newfoundland. This Sable Island plant I described as *P. pusillus* L., var. *capitatus*, in *Journ. Bot.*, 1901, 202. I then noticed its likeness to *Aschersonii*, but it is very remarkable that a S. American species should reappear in British N. America. But accepting it as such, specimens from Ontario, Canada, Macoun, No. 22203, and from Dover, Maine, U.S.A., 1894, W. [M.] L. Fernald, must be so named, but I do not wholly accept them.' Thus, on Sable Island there are either many more pondweeds (and some of them extraordinary plants) than Macoun and, after him, St John preserved in the Canadian National Herbarium and the Gray Herbarium or sent to Bennett, or else there has been very serious misinterpretation of the one Linnean species which has been repeatedly collected there. In fact, after treating the Sable Island plant as *P. pusillus*, var. *capitatus*, to which he referred the type of his earlier-published var. *elongatus*, Bennett later identified it as *P. Sturrockii*. Its identification as *P. Aschersonii* has just been noted. To add to the dilemma, we are seriously told by Hagström that ' Of a hybrid origin are, no doubt, the vars. *capitatus*, . . . and *Sturrockii* ' (*l.c.* 124). This is the last straw! The little *P. pusillus*, var. *tenuissimus*, of Sable Island, passing into var. *mucronatus*, is not only that species but is said, likewise, to be *P. Sturrockii*, *P. Aschersonii* and *P. pusillus*, vars. *elongatus* and *capitatus*, and it is also ' no doubt ' two different hybrids. As the only representative of the *Pusilli* known to occur there, it has certainly achieved wonders. . . . *P. Aschersonii* is quite unlike any species known to me from N. America."

This somewhat lengthy extract is by no means exceptional; many other American species have been equally confused. "*Potamogeton epihydrus* is another case (like *P. foliosus*, *P. diversifolius* and *P. dimorphus*, as well as the unrelated *P. tenuifolius* Raf.) where students of the Pondweeds have contented themselves with an erroneous guess as to the type, apparently without any attempt to get at the material, quite accessible at Paris, upon which the species was based." As a result of this confusion the outstanding impression produced by a study of this fine monograph is the extraordinary difficulty which confronted the author in his attempt to revise the group and the exceptional value of the results achieved. The 40 large plates at the end of the volume are remarkable examples of care and skill in photography. They are infinitely preferable—from a scientific point of view—to the best drawings. Their details can be quoted as evidence whereas those of drawn figures are frequently faulty in that respect. The printing, arrangement, wide margins and general presentation are of the highest order. Botanists generally will welcome the work as a most valuable contribution to the study of the genus and will earnestly hope that Prof. Fernald may, in due time, deal in an equally exhaustive manner with the larger-leaved species. In view of the criticism of much of the work of the late Mr A. Bennett, which the publication of this monograph made inevitable, we are bound to add—in justice to Prof. Fernald—that in our judgment it is a scrupulously fair, moderate and accurate statement of facts inadequately realised on this side of the Atlantic.—W. H. P.

ABSTRACTS OF PAPERS BEARING ON THE STUDY OF THE BRITISH FLORA, 1932.

A. J. Wilmott and J. S. L. Gilmour.

Note.—The proposal to write these abstracts having been made only a short time ago and the time at our disposal being limited, we have endeavoured to mention as many papers as possible, accompanied by brief abstracts, rather than to treat a few papers fully. It is hoped that, in this way, the attention of British botanists will be drawn to various papers which they can then read in detail from the originals if they so desire. In future, if time permits, the information of interest to British botanists will be presented in rather more detail than has been possible in the present Report.

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1. ADAM, R. M. "The Scottish Alpine Botanical Club Excursion, 1931." *Trans. Bot. Soc. Edin.*, xxxi, 230-237. Base of operations, Strath Carron in W. Ross. The search for *Eriophorum alpinum* "alleged picked in August 1930 by Professor Fernald" proved fruitless. Plate II contains fine photographs *in situ* of *Arctostaphylos alpina* and *Pinguicula lusitanica*.

2. ALSTON, A. H. G., SANDWITH, C. I. and N. Y. "New Records for Pembrokeshire." *Journ. Bot.*, lxx, 237. Nine flowering plants added to the existing lists, and some notes on other species seen.

3. AUSEKELIS, H., and ZAMELIS, A. "Ein schon von F_1 an konstanter Bastard—*Viola arteficiosa* Ausekl., erhalten durch Kreuzung von *V. bosniaca* Form. ♀ mit *V. arvensis* Murr. ♂." *Acta Hort. Bot. Univ. Latv.*, vi, 95. The paper commences with a general discussion on constant, fertile species-hybrids, followed by a survey of hybridization and species-evolution in the genus *Viola*. The production of a constant and fertile interspecific hybrid between the Balkan species, *V. bosniaca*, and *V. arvensis* is recorded. This is phenotypically very like the male parent and, pending cytological investigation, the possibilities of its being produced either by allopolyploidy or by androgenesis are discussed.

4. BARTON, W. C., and RIDDELSDELL, H. J. "*Rubus latifolius* Babington." *Journ. Bot.*, lxx, 107. "True *R. latifolius* Bab. is not known to occur elsewhere than at Cramond Bridge [near Edinburgh] and at the two spots in Perthshire." The Anglesea plant, which has been so named, is described as a new species, *R. monensis*.

5. BARTON, W. C., and RIDDELSDELL, H. J. "*Rubus leucanthemus* ? P. J. Muell. (Auctt. Brit.)." *Journ. Bot.*, lxx, 188. The British plants, which have been so named, are deemed wrongly identified and are described with the following new names:—*R. surrejanus* with a var. *wealdensis*, and *R. purbeckensis*. The types are all in Herb. Barton and Riddelsdell.

6. Beretovsky, A. " Zur Frage über die Parthenokarpie der *Salix alba* L., *S. caprea* L., *Populus alba* L., und *Ulmus campestris* L." *Journ. bot. de l' URSS*, xvii, 399. Experimental attempts to produce fruit without pollination by the use of irritants such as chalk, *Lycopodium* spores, and hazel pollen, gave the following results:—

   Salix alba L. Parthenocarpy only with chalk (19.3%); the fruits being well-developed closed capsules filled by a tuft of hairs but without seed. Natural pollination gave 52.7% normal capsules with seeds; artificial pollination 82.5%.

   Salix caprea L. No parthenocarpy produced, but some well developed capsules were seen which had neither seeds nor hair-tufts.

   Populus alba L. 100% parthenocarpy obtained without participation of irritants; with irritation 78.5-100%. The parthenocarpic fruits are normally developed but with hair-tuft instead of seed.

   Ulmus campestris L. 9.8% parthenocarpic fruits without irritants; 1.1-7.9 with irritants. Parthenocarpic fruits are very similar to normal, but lighter in weight (more spongy and seedless).

7. Bergdolt, E. " Morphologische und physiologische Untersuchungen über *Viola*." *Bot. Abhandl.*, Heft 20. Among other experiments on the morphology and physiology of the genus, the author has investigated the influcnce of external factors such as moisture and increase of nitrogen in the soil on the form of the stipules in several species, including *V. sylvestris*, *V. Riviniana*, *V. hirta*, *V. canina* and *V. odorata*. In the first two species this was not marked but in the others increased moisture caused a lengthening of the cilia, while high nitrogen content produced almost entire stipules. The subject of cleistogamous flowers in general is discussed and a series of experiments on their development in *Viola* is described. It is shown that the first formed flowers in seedling plants are always cleistogamous and that the later production of chasmogamous flowers is dependant on the plant being well nourished. Qualitative and quantitative experiments are described showing the effect of external factors such as nourishment, light and temperature on the number and type of flowers produced. The most important factor in producing chasmogamous flowers is shown to be high mineral and organic content of the soil while the effect of a decrease in light-intensity is to diminish the number of flowers produced without altering the type. The paper closes with a study of the morphology of the *Viola* flower, with special reference to teratology.

8. Bergman, B. " Aposporie bei *Picris hieracioides* und *Leontodon hispidus*." *Svensk Bot. Tidskr.*, xxvi, 453. This brief paper forms an interim report, in which the author shows that these two species are partially aposporous. The chromosome number of *P. hieracioides* is n=5, and that of *L. hispidus* n=7. A fuller paper is to follow.

9. Boyd, L. " Monocotyledonous Seedlings—Morphological Studies in the Post-seminal Development of the Embryo." *Trans. Bot. Soc. Edin.*, xxxi, 1-224. The following British species are described:—

Triglochin maritimum (p. 13); *Crocus vernus* (p. 69); *Arum italicum* (p. 76); *Tamus communis* (p. 81).

10. Brenner, W. "Beiträge zur edaphischen Ökologie der Vegetation Finnlands: II, Wiesen." *Acta Bot. Fenn.*, ix. The edaphic factors influencing the vegetation of the meadow-lands of S. Finland and of Limingo are discussed, many British species being mentioned.

11. Britton, C. E. "Notes on Surrey Plants." *Journ. Bot.*, lxx, 314 and 332. Four plants new to the county and several varieties not in Salmon's Flora; also many additional localities.

12. Butcher, R. W. *Fedde Rep.*, xxx, 251 ("Vermischte neue Diagnosen"). Descriptions in Latin of *Thalictrum Babingtonii* and *T. umbrosum* are given. [No types are mentioned, but Mr Butcher has informed me that the type localities are respectively Royston Heath (Herts)—from whence the specimen figured came—and Loch Rannoch (Perthshire). The names will date from the 1930 descriptions in English, these being validated by the Cambridge Congress decisions.—A.J.W.].

13. Clapham, A. R. "The Form of the Observational Unit in Quantitative Ecology." *Journ. Ecology*, xx, 192. The author shows that the quadrat is not the most efficient unit for counting, listing or charting homogeneous vegetation, and suggests that a rectangular strip 4 metres by ¼ metre should replace it in ecological work.

14. Coban, R. "Su La Flora Dei 'Gessi' Bolognesi." *Nuovo Giorn. Bot. Ital.*, xxxix, 313. The vegetation of a calcareous area near Bologna is described and analysed, many British species being mentioned.

15. Desch, H. E. "Anatomical Variation in Dicotyledonous Trees." *New Phytol.*, xxxi, 73-118. British material of the following species was investigated:—*Alnus glutinosa*, *Betula alba*, *B. pubescens*, *Fagus sylvatica*, *Populus canescens*, ×*P. serotina* and *Acer Pseudoplatanus*. Variation in cell size can be considerable in a single sample; there is correlation between the annual increment and cell size at a given height in a tree; an initial period (first 5-10 years) of rapid increase in cell size exists. The numbers and proportions of vessels in the annual rings was studied; also the specific gravity.

16. Drabble, E. "The Genus *Crepis* in Great Britain." *Journ. Bot.*, lxx, 274. The following species are discussed:—*C. nicaeensis* Balbis, *C. capillaris* Wallr., var. *anglica* Druce & Thellung, and *C. oporinoides* Boiss. The latter name is given to a nearly glabrous plant allied to *C. biennis*, found first in N. Yorkshire and again in tho I. of Wight.

17. Drabble, E. "A Variety of *Clematis Vitalba* L." *Journ. Bot.*, lxx, 83. A plant from Thorley, I.W., with long narrowly lanceolate acuminate leaflets is described as var. *Timbali* Drabble (var. *lanceolata* Timb. in sched., ined.).

18. Druce, F. "*Vicia cassubica* L. in Britain." *Journ. Bot.*, lxx, 52. Found in two places in a worked-out gravel-pit at Greenhithe, Kent.

19. Eklund, O. "Uber die Ursachen der regionalen Verteilung der Schärenflora Südwest-Finnlands." *Acta Bot. Fenn.*, viii. The factors governing the distribution of the vegetation of S.W. Finland, with special reference to the districts of Korpo and Houtskär, are described and discussed, the great majority of the species mentioned being British.

20. Erdtman, G. "The Northwestern distribution limit of *Fagus silvatica* L." *Svensk Bot. Tidskr.*, xxvi, 201. The author criticises Lindquist's explanation of the slow north-western migration of the beech during the Atlantic Period and suggests that Britain, being on the edge of its distribution area, is a favourable locality for testing the ecological requirements and behaviour of this tree.

21. Evans, E. Price. "Cader Idris: a Study of certain Plant Communities in South-west Merionethshire." *Journ. Ecology*, xx, 1. This paper gives the results of a more or less detailed study of the vegetation of a belt transect across (up) the north-facing slope of the Cader Range from the valley bottom to the summit plateau. After a summary of the climate, geology, topography and geography of the area, three vegetational zones are described in detail, namely those of "cultivation and rough enclosed pasture," consisting of arable land, meadows and associated pastures, and of plantations and remnants of former woodlands; "moorland," comprising patches of heather moor, of wet moor and a considerable area of grass moor; and "arctic-alpine vegetation," including the formation of mountain-top detritus, chomophytic vegetation of crags and corries, the vegetation of screes and of moraines, and a high level grassland which in some respects resembles arctic-alpine grassland. The plant communities of each of these zones are described in some detail and the factors governing their distribution are discussed.

22. Flintoff, R. J. "*Arctostaphylos* in N.E. Yorkshire: a doubtful record." *Journ. Bot.*, lxx, 235. "*Arctostaphylos* may be and is confused with *Vaccinium Vitis-idaea* Linn." "I feel justified in believing that *A. Uva-ursi* does not grow now in N.E. Yorkshire, and most probably never did."

23. Florschütz, F. "Resultate von Untersuchungen an einigen niederländischen Mooren." *Rec. trav. bot. néerl.*, xxix, 1. The results of a pollen analysis on a moor in the N.E. of the province of Utrecht are described and discussed.

24. GAYER, GY. "Phytographische Notizen." *Magyar Bot. Lapok*, xxxi, 44. A "mutational form" of *Symphytum tuberosum* L.—f. (mutatio) *pseudobulbosum*—is described.

25. GEORGIEFF, T. "Additamenta ad Hieracii Bulgarici." *Bull. Soc. Bot. Bulg.*, v, 93. A number of new sub-species are described with Latin diagnoses.

26. GIBSON, C. M. "Seeds and Tubercles in *Ficaria verna* Hudson." *Journ. Bot.*, lxx, 239. "Observations . . . . seem to show that the occurrence of the latter is influenced by both climate and soil." Details of observations are given [but there is no attempt to identify the plants observed with the described varieties of the species].

27. GODWIN, H., and BHARUCHA, F. R. "Studies in the Ecology of Wicken Fen: II. The Fen Water Table and its Control of Plant Communities." *Journ. Ecology*, xx, 157. The authors show that the water table of the Fen is affected throughout the year by the factors of transpiration, rainfall and the fen drainage system, and that in summer the water table is low and concave, and in winter high and flat over the whole fen. The distribution of the plant communities is in all probability controlled by water excess in winter rather than by water deficiency in summer.

    On considering the main plant communities and their soil level/water level relations at the period of high water level, it is suggested that the Phragmitetum, Cladietum and Rhamnetum are successive stages of the prisere, whereas the Molinio-Cladietum and Molinietum are phases of successions deflected from the prisere by cutting at intervals of one or two years, or four or five years respectively.

    From continuous water level records throughout three years, it is shown that areas in the upper part of the Cladietum are liable to be subjected to winter flooding of several weeks' duration and that this, in all probability, is the factor through which the winter control of bush distribution operates.

28. GRIFFITHS, B. M. "The Ecology of Butterby Marsh, Durham." *Journ. Ecology*, xx, 105. The topography and history of the marsh, which lies on the River Wear, two miles south of the City of Durham, are described. The vegetation, with the exception of four plants, is shown to be uniformly distributed with reference to the water level.

    With regard to the successional development of the plant communities the author concludes that the societies of *Phragmites* represent the original vegetation. The water level then fell (due to erosion of the bed of the river) and the ground became progressively drier, thus enabling plants such as *Rumex hydrolapathum* and *Equisetum limosum*, and finally "marsh forest" consisting of *Alnus* and species of *Salix* to invade and colonise the ground. This colonisation is now over and the present phase is one of autogenous development due to the accumulation of the products of decay.

29. HALKET, A. C. "A note on the occurrence of abnormal flowers in *Nasturtium officinale* R. Br.," *New Phytol.*, xxxi, 284. Description of a flower in which, in addition to the normal organs, two accessory florets occurred inside each of the outer stamens. These possessed perianth parts (3-4), stamens (1-3), and staminode on a filamentoid stalk, no two florets being alike and none of cruciferous type.

30. HEILBORN, O. "Aneuploidy and Polyploidy in *Carex*." *Svensk Bot. Tidskr.*, xxvi, 137. *C. glauca* Scop. (*C. diversicolor* Crantz) is shown to be unique in the genus in possessing quadrivalent chromosomes at meiosis. This is taken to indicate that the species is probably an auto-tetraploid (n = 38) derived, possibly by somatic doubling, from a diploid (n = 19) ancestor, whose chromosome constitution must have been very similar to *C. panicea*, with which species the author has now no hesitation in grouping *C. glauca*.

It is pointed out that the Cyperaceae are unique among plants in showing an exclusively aneuploid series of chromosome numbers and it is tentatively suggested that their peculiar mode of pollen formation, in which three cells of the tetrad always degenerate, may in some way be incompatible with the formation of unreduced pollen-grains and hence with the production of polyploid series.

31. JARETZKY, R. "Beziehungen zwischen Chromosomenzahl und Systematiff bei den Cruciferen." *Jahrb. f. wissensch. Bot.*, lxxvi, 485. The chromosome numbers of 44 genera of Cruciferae are given and the light that these numbers throw on the relationship between the genera is discussed.

32. JORDANOFF, D. "Neue und seltene für Bulgarien Pflanzen." *Bull. Soc. Bot. Bulg.*, v, 63. Among the new plants mentioned are *Scirpus triqueter* L., and *Sagina maritima* Don.

33. KROSCHE, E. "Ergänzungen zu den Beobachtungen an der Gesamtart *Epipactis latifolia* All." (in *Fedde Rep.*, xxvii, 368-383). *Fedde Rep.*, xxx, 239. A synopsis of the forms is given (p. 244) in which the usual British form is "A. I. *genuina* (nov.) . . . a. *platyphylla* (Irm.)" with four forms: (—b. *viridiflora* Hoffm.-Rchb.) is not British—). *E. leptochila* Godfery is under "A. II. *Godferyi* (nov.)" as f. *leptochila*.

34. LAMMERMAYR, L. "Der Lichtgenuss von *Juniperus communis* und die Wacholdergärtchen des Schöckels bei Graz." *Öst. Bot. Zeit.*, lxxxi, 209. The light requirements of *J. communis* are discussed and a description is given of the plant communities containing it near Graz.

35. LANGLET, O. "Uber Chromosomenverhaltnisse und Systematik der Ranunculaceae." *Svensk Bot. Tidskr.*, xxvi, 381. The author gives a survey of the known chromosome numbers of the family and correlates these with the classification of the family on morphological criteria.

36. Lehmann, E., and Schnitzler, O. "Hemmungsgene und taube Samen in *Epilobium*-Kreutzungen." *Ber. d. Deutsch. bot. Ges.*, l, 185-187. Arrested developments and infertile seeds—which are especially frequent in hybrids with *E. hirsutum* or *E. parviflorum* used as female parent—are heritable and due to genes. In these two species these "Hemmungsgenen" can lead to more or less pronounced arrest of development not only of the whole plant in all its parts, but also of the young embryo in the seed.

37. Lengyel, G., and Zahn, K. H. "Beiträge zur Kenntnis der Hieracien Ungarns und der Balkanlander IX." *Magyar Bot. Lapok*, xxxi, 1. Eighteen new sub-species are described and the distribution in Hungary and the Balkans of many others is given.

38. Lindquist, B. "Taxonomical remarks on *Juncus alpinus* Villars and some related species." *Bot. Notiser*, 314-372. Most of the British records, including the Teesdale plant, are placed under *J. alpinus* Vill. The Blair Atholl plant is referred to var. *rariflorus* (E. Fries) Hartm., and *J. Marshallii* Pugsley is reduced to a variety of *J. alpinus*. Distribution maps are given.

39. Maier, W. "Untersuchungen zur Frage der Lichtwirkung auf die Keimung einiger *Poa*-Arten." *Jahrb. f. wissensch. Bot.*, lxxvii, 321. Experiments on the influence of temperature and light on the germination of *Poa nemoralis*, *P. pratensis*, *P. palustris* and *P. compressa* are described and discussed.

40. Marsden-Jones, E. M., and Turrill, W. B. "Genetics of Anthocyanin Inheritance and of Other Characters in *Silene maritima*." *Kew Bull.*, 1932, 229. An account is given of the selfing and crossing in pairs of three plants of *S. maritima*. The production of anthocyanin, which may or may not occur in almost any of the vegetative or floral parts, is shown to be due genetically to the interaction of several genes. Other characters studied are breadth of calyx, overlapping of petals, sex, and testa markings.

41. Marsden-Jones, E. M., and Turrill, W. B. "A Statistical Study of Characters in a Wild Population of *Silene vulgaris*." *Kew Bull.*, 1932, 271. A statistical analysis of the characters of a population of *S. vulgaris* from Berkshire is given. This analysis is to be compared with similar ones on coastal and high mountain populations to be published in the future, when its full significance will be apparent.

42. Melderis, A. "Genetical and Taxonomic Studies in the Genus *Erythraea* Rich. I." *Acta Horti Bot. Univ. Latv.*, vi, 123. The author gives a diagrammatic scheme of relationship within the genus. Four main groups are recognised, *Eu-erythraea* Griseb. (including *E. Centaurium*, *E. vulgaris*, *E. pulchella* and *E. Massoni*), *Trichostylus* Griseb. (including *E. Roxburgii* and other American species), *Spicaria* Griseb. (including *E. spicata*) and *Xan-*

thea Rchb. (consisting of *E. maritima*). Within *Eu-erythraea* are four sub-groups corresponding to the four above-mentioned species, the relation between constituent species being shown by connecting lines. There follows a survey of morphological characters, drawn mostly from herbarium material and original diagnoses. Attention is drawn to the parallelism of characters in different species, notably in *E. capitata*, *E. glomerata* and *E. Morieri.*

" Wild growing hybrids " between different species and races are enumerated from herbarium material and published descriptions, *E. tenuiflora* and *E. latifolia* being described as hybrids between *E. Centaurium* and *E. pulchella.*

Seed of a number of species was obtained from different localities in Europe and N. Africa, and plants were also transplanted into the experimental garden. From this material and from herbarium specimens distinct biotypes of *E. pulchella* (transplants), *E. Centaurium* (rosettes grown from seed), and *E. vulgaris* (herbarium specimens) are described. Reciprocal crosses and selfings were made in three *E. pulchella* biotypes, all except two crosses producing seeds. Reciprocal interspecific crosses and selfings were also made in *E. Centaurium* (3 biotypes), *E. pulchella* (2 biotypes), *E. vulgaris* (2 biotypes), and *E. maritima* (1 biotype), positive results being obtained between the majority of biotypes of all the species. The cross *E. maritima* ♀ × *E. Centaurium* and *E. vulgaris* ♂ could not be made owing to lack of pollen.

The paper closes with a number of published and original observations on pollination, seed formation, and germination, and the conclusion that " *E. pulchella*, *E. Centaurium* and *E. vulgaris* produce in crossing experiments hybrids and so form one ' comparium ' (Danser, 1926 b.)." " It is probable, that *E. maritima* . . . belong also to this comparium."

[The author gives Norway, England and France as the distribution of *E. latifolia* Sm. He has, however, subsequently informed me in a letter that his data were copied from " Flora Caucasica Critica " and are incorrect, *E. latifolia* having been recorded only from Lancashire.—J.S.L.G.]

43. MELDERIS, A., and VIKSNE, A. " Notes on the genus *Lathyrus*." *Acta Hort. Bot. Univ. Latv.*, vi, 90. The chromosome numbers of ten species, including *L. maritimus*, *L. pratensis* and *L. sylvestris*, are given and are shown to be $2n=14$ in all species. Twenty interspecific crosses were attempted, but in no case were they successful.

44. MILLNER, M. E. " Natural Grafting in *Hedera Helix*." *New Phyt.*, xxxi, 2-25. An account of natural grafting and comparison with artificial grafting is given.

45. MILNE-REDHEAD, E., and TURRILL, W. B. " Variation in *Anemone nemorosa*." *Journ. Bot.*, lxx, 325. Several forms and lines of variation (both in foliage and floral organs) are described, but no sharp lines of demarcation can be found between named varieties.

46. MINIO, M. "Le Osservazioni Fitofenologiche Della Rete Italiana Nel 1930 e 1931." *Nuovo Giorn. Bot. Ital.*, xxxix, 76 and 659. The dates of flowering of a large number of species, many of them British, in different Italian localities during the above years are recorded.

47. MUNTZING, A. "Untersuchungen über Periodizität und Säison-Dimorphismus bei einigen annuellen *Lamium*-Arten." *Bot. Notiser*, 153-176. The species discussed are *L. purpureum* L., *L. hybridum* Vill., *L. intermedium* Fr., and *L. amplexicaule* L. Summer-annual and winter-annual forms occur and have been crossed. In *L. purpureum* there is no difference in the leaf shape of the two forms, but in *L. hybridum* and *L. intermedium* the difference is considerable.

48. NEGODI, G. "Aspetti della partenocarpia in specie del genere *Papaver*." *Annali di Bot.* (*Torino*), xix, 497. The phenomenon of parthenocarpy in the genus is discussed and *P. bracteatum*, *P. somniferum* and *P. Rhoeas* are shown to exhibit it in varying degrees. *P. Rhoeas* is self-pollinating, though nearly always self-sterile, and the great majority of capsules are developed by parthenocarpy. Capsules developed after self-fertilisation, though very similar to those produced by parthenocarpy, are sometimes slightly larger and show small morphological differences in the disc and pores. The physiological processes involved in parthenocarpy are discussed.

49. NEGODI, G. "Comportamento del cromatismo dei petali in incroci intraspecifici di *Papaver Rhoeas* L. e sua interpretazione." *Annali di Bot.* (*Torino*), xix, 510. Experiments on the genetics of flower-colour in *P. Rhoeas* are described and discussed.

50. NICHOLSON, C. "The Mistletoe and its hosts." *Gard. Chron.*, Ser. 3, xci, 102, 145. After an outline of the history, distribution, development and cultivation of Mistletoe, a list of known host plants is given. An interesting correspondence, lasting the whole year, followed this article.

51. NICHOLSON, C. "Staminodal Form of *Erica Tetralix* L. in Cornwall." *Journ. Bot.*, lxx, 24. The flowers have the petals replaced by stamens, sometimes also with normal flowers and others intermediate. The same abnormality was described in Holland by Costerus in 1890.

52. NIJDAM, F. J. "Kruisingen met *Trifolium pratense* L." *Genetica*, xiv, 161. Genetical experiments on the following characters are described and discussed:—Incompatibility, seed colour, flower colour, chlorophyl production, sterile stamens, prostrate habit, and dwarfness.

53. NOACK, K. L. "Uber *Hypericum*-Kreutzungen, II." *Ber. d. Deutsch. bot. Ges.*, l, 256-268. An account of artificial reciprocal hybrids between *H. acutum* (*i.e.*, *H. dubium*) and *H. montanum*.

54. Oehm, G. "Beitrag zur Kenntniss der Blattanatomie und Behaarung von *Plantago media* L., *Pl. major* und *Pl. lanceolata* L." *Beih. z. bot. Centralb.*, l, 1, 20-43. The leaf-anatomy and hairs are described and the possibility of determining leaf fragments is discussed.

55. Pampanini, R. "Materiali Per Lo Studio Delle Artemisie Asiatiche." *Nuovo Giorn. Bot. Ital.*, xxxix, 19. Among the species dealt with is *A. campestris* L., of which two varieties, one form and one sub-form are enumerated.

56. Papp, C. "Monographie der europäischen Arten der Gattung *Melica* L." *Bot. Jahrb. (Engler)*, lxv, 274-438. No varieties are distinguished in *M. nutans*, and only the var. *typica* Papp of *M. uniflora* is indicated for Britain.

57. Petch, C. P. "Additions to the Flora of St Kilda." *Journ. Bot.*, lxx, 169. Fourteen species listed which are not in Dr Turrill's list (*B.E.C. Rep.*, viii, 428-444), all from the main island, Hirta. Many species were much more abundant than that list indicates.

58. Pop, E. "Beitrag zur quaternären Pflanzengeschichte Sieberbürgens (Rumänien)." *Bull. Jard. Mus. Bot. Univ. Cluj*, xii, 28. The results of a pollen analysis in the "Siebenbürgische Bihor-gebiet" in W. Roumania are given, five successive phases being distinguished.

59. Praeger, R. Ll. "A Climbing Form of *Calystegia Soldanella*." *Journ. Bot.*, lxx, 50. This species is generally stated to be non-climbing, but in eastern Ireland a form with stems 1½-2½ feet long, (climbing to 1-1½ feet—generally on *Ammophila*) occurs, sometimes to the exclusion of the normal form. "It may be known as f. *volubilis*."

60. Praeger, R. Ll. "Some Noteworthy Plants found in or reported from Ireland." *Proc. Roy. Irish Acad.*, xli B, 95-124. Results of field work on Irish *Cochlearia*; *Sarracenia purpurea* naturalised in Roscommon and Westmeath; *Arbutus Unedo* native in Sligo; *Spartina Townsendii* introduced into Ireland; *Equisetum litorale*; and examination of validity of various other records.

61. Praeger, R. Ll. "Recent views bearing on the Problem of the Irish Flora and Fauna." *Proc. Roy. Irish Acad.*, xli B, 125-145. The author is inclined to think that much of the present Flora and Fauna reached Ireland over land surfaces, either during interglacial or post-glacial times, but that the American and Lusitanian elements are preglacial.

62. Pratt, C. A. "Investigation of the Vascular Anatomy of the Flowers of *Silene maritima*." *Kew Bull.*, 1932, 390. Flowers of *S. maritima* showing both normally and poorly-developed anthers and petals were examined and no evidence was found to support

the suggestion made by R. O. Whyte (*Nature*, cxxiii, 113, and *Journ. Genetics*, xxiii, 109) that lack of development is due to anatomical defects of the vascular bundles.

63. Provasi, T. "Contributo Alla Conoscenza Del Carpostegio Nelle Labiate." *Nuovo Giorn. Bot. Ital.*, xxxix, 254. The arrangement of the hairs in the throat of the calyx in about thirty genera of Labiatae is described, and the different types of arrangement are classified according to their morphology, behaviour and function.

64. Pugsley, H. W. "*Limonium paradoxum* Pugsley." *Journ. Bot.*, lxx, 80. Observations on the plant in the field and completion of the description of the corolla:—Broadly oblong, retuse, and imbricated perianth-segments . . . diam. about 4 mm. . . . clear violet, with a rosy mid-vein to each segment.

65. Rechinger, K. H. "Vorarbeiten zu einer Monographie der Gattung *Rumex* I." *Beih. z. bot. Centralb.*, xlix, 2, 1-132. In this part the following British species are treated:—*R. pulcher* L., *R. obtusifolius* L., and the alien, *R. dentatus* L. For the British Isles are given *R. pulcher*, ssp. *eu-pulcher* Rech. fil. (the usual form), and the ssp. *divaricatus* (L.) Murb. (an alien) "Kew, Surrey (Nicholson); rubbish heap near Glasgow (R. Grierson);" *R. obtusifolius*, ssp. *agrestis* (Fr.) Danser, and ssp. *silvester* (Wallr.) Rech. The hybrids of these species with others are also treated, and distribution maps of the sub-species are given.

66. Schoute, J. C. "Uber die Caryophyllaceen-Dekussation." *Ber. d. Deutsch. bot. Ges.*, l, 229-236. Comparison of the decussation in Caryophyllaceae with that of other families and discussion of its origin.

67. Sirjaev, G. "Generis *Ononis* L. revisio critica." *Beih. z. bot. Centralb.*, xlix, 2, 381-665. Our *O. reclinata* is under var. *Linnaei* Webb & Berth. (p. 502), and is regarded as alien [in ignorance, no doubt, of the fact that the associated rarities indicate that it is a relict]. *O. spinosa* L. (p. 575) and *O. repens* L. (p. 596: *O. arvensis* auct. angl. non L.) both have several varieties with which the British forms must be compared.

68. Stearn, W. T. "Sertum Cantabrigiense exsiccatum." *Journ. Bot.*, lxx, Suppl. ii, 13-29. This series includes the following British Elms, long synonymies being given:—× *U. hollandica* Miller, *U. minor* Mill. sec. Henry (*U. sativa* Mill. sec. Moss; *U. Plotii* Druce), *U. nitens* Moench, *U. nitens*, var. *Hunnybunii* Moss, also var. *Sowerbyi* Moss, *U. procera* Salisb. (*U. suberosa* Sm.; *U. anglica* Druce), *U. stricta* Lindl., and × *U. vegeta* (Loud.) Ley (*U. glabra* Huds. emend. [*U. montana* Stokes] was included in the Herb. Flor. Cantab.). An anomalous plant from the Botanical Gardens, Cambridge, is included as "(? ×) *U. viminalis* Loddiges," to which is referred the "*Ulmus folio angusto glabro*

Plot, sec. Moss et Henry, nec Druce." [This is an error, the specimen in Herb. Sloane so determined by these botanists is *U. nitens* Moench.—A.J.W.]

69. Stearn, W. T., and Gilmour, J. S. L. "Schedae ad Herbarium Florae Cantabrigiensis—Decades I-II." *Journ. Bot.*, lxx, Supp. ii, 1-12. Among the plants distributed are *Bromus lepidus* Holmb. (*B. britannicus* Williams), the Gogmagog Fumitories including *F. parviflora*, var. *Symei* Pugsley, the long known pale-flowered form of *Geranium pyrenaicum*, here named f. *pallidum*, and *Thalictrum Babingtonii* Butcher from Fulbourn.

70. Todd, E. Enever. "A Short Survey of the Genus *Viola*, Part II. The Chamaemelanium and Melanium Sections." *Journ. Roy. Hort. Soc.*, lvii, Pt. 2, 212 (continued from op. cit., lv, 223). In his treatment of the Melanium section of the genus ("the Pansies") the author discusses the range of variation in and geographical distribution of *Viola tricolor* L., sensu lat. and other allied species.

71. Vegis, A. "Uber das Frühtreiben der Winterknospen von *Hydrocharis Morsus-ranae* L. durch hochtemperierte Wasserbäder." *Jahrb. f. wissensch. Bot.*, lxxv, 726. Experiments on the effect of high temperatures on the winter resting-buds of *H. Morsus-ranae* are described and discussed.

72. Vignolo-Lutati, F. "Le Langhue E La Loro Vegetazione." *Nuovo Giorn. Bot. Ital.*, xxxix, 523. The author draws the attention of orchidologists to an *Epipactis*, allied to *E. rubiginosa*, preserved in the "Herbarium Pedemontanum dell'Orto Botanico Torinese," which was collected "nell ' Albese" by Bertero in 1823 and 1824 and named by him on the sheets *E. cruenta*, and which has apparently not been collected since.

73. Viksne, A. "Uber den experimentell erzeugten Bastard *Rubus Idaeus* L. ♀ × *R. saxatalis* L. ♂." *Acta Hort. Bot. Univ. Latv.*, vi, 84. The artificial production of the above hybrid is recorded, many seedling plants, all resembling the male parent, having been raised.

74. Viksne, A. "Vorläufiges Mitteilung über die Kreuzungsversuche mit *Ribes*." *Acta Hort. Bot. Univ. Latv.*, vi, 86. Eight artificial crosses are recorded, including *R. nigrum* ♀ × *R. rubrum* ♂, and *R. nigrum* × *R. Grossularia*.

75. Wagner, J. "Lindenstudien." *Magyar Bot. Lapok*, xxxi, 55. New varieties and hybrids of *Tilia cordata* Hill, and of *T. platyphyllos* Scop. are described without Latin diagnoses.

76. Wein, K. "Die älteste Einfuhrungs-und Einburgerungsgeschichte des *Erigeron canadensis*." *Botanisches Archiv*, xxxiv, 394. The author traces the course of the introduction of this plant from America into Europe and discusses the factors, such as wind and human agency, which have affected its subsequent spread.

77. WILLIAMS, I. A. "*Veronica Anagallis* L. × *Veronica aquatica* Bernh." *Journ. Bot.*, lxx, 52. This hybrid, which is quite sterile, has been found twice in Oxfordshire (in 1929 in the Port Meadow, Oxford, and in 1930 at Wolvercot).

78. WINGE, Ö. "On the origin of constant species-hybrids." *Svensk Bot. Tidskr.*, xxvi, 107. Twenty-four constant, fertile species-hybrids are discussed. Eight are shown to have arisen through somatic chromosome doubling (*e.g.*, *Saxifraga potternensis*), five through the union of diploid gametes (*e.g.*, *Raphanus sativus* × *Brassica oleracea*), and eleven are of doubtful origin (*e.g.*, *Spartina Townsendii*).

79. ZAMELIS, A. "Fruchtende *Lysimachia Nummularia* L. in Lettland." *Acta Hort. Bot. Univ. Latv.*, vi, 123. The occurrence is recorded in wild localities in Latvia of two fruiting colonies of this plant, which is almost exclusively vegetatively propagated in nature, though successful pollination has been experimentally carried out between two populations from widely separated localities.

COLONEL M. J. GODFERY'S MONOGRAPH AND ICONOGRAPH OF NATIVE BRITISH ORCHIDACEAE.

P. M. Hall.

The eagerly anticipated publication of this work occurred on March 29th, 1933. As is stated in the Preface, no monograph of British Orchids with coloured plates has hitherto been published; further, it may be said that no work dealing solely with British Orchids has appeared since the publication of A. D. Webster's book in the year 1886. In the interval, and especially in the last 20 years, the British Orchidaceae have been the subject of a great deal of research, the results of which are to be found in numerous papers scattered through the pages of the *Reports* of this Society, *The Journal of Botany*, *The Orchid Review*, and the *Reports of the Winchester College Natural History Society*, to mention some of the sources only. The revision and editing of all the information thus available would of itself have been a most commendable work, but when it is allied with such illustrations and with the results of Colonel Godfery's own powers of observation it is impossible to exaggerate the debt owed to him by the students of this group.

The book is dedicated to the late Mrs Hilda Godfery, of whom a photograph is printed and to whose art we are indebted for the beauty of the coloured plates, which are the first feature to arrest the reader's attention. We have, however, to thank her for more than this, for we are told in the dedication that without her the book itself could not have been written. The 57 coloured plates form a selection from the total of 245 water-colour drawings by Mrs Godfery, of which 184 were exhibited in London in 1925 and received the gold medal of the Royal Horticultural Society, while 229 were shown at the Fifth International Botanical Congress at Cambridge in 1930. By the courtesy of Colonel Godfery and the Cambridge University Press, advance prints of some of the plates were on view at the Conversazione of this Society and the Wild Flower Society in November last and excited the admiration of those present.

These drawings were made in every case from living plants and through the excellence of modern technical process the plates give an entirely life-like representation of the plants illustrated. In many cases the drawings were made from Continental specimens, which at first sight may appear a curious feature in a Monograph of British Plants, but has at least two advantages. Many of our native Orchids are now unfortunately of extreme rarity; in one instance at least, *Orchis militaris*, it is doubtful whether a British specimen could have been obtained during the period in which the drawings were made. In other cases the taking of complete specimens for illustration would have put a further strain upon the existence of species already verging upon extinction. The second advantage is the opportunity thus afforded of comparing the Continental and British plants. Colonel Godfery has always been quite rightly an advocate of the necessity for British botanists to avoid insularity. In the case, however, of some of the more critical groups and of the hybrids, the individual plants illustrated are in nearly all cases British. No group of plants presents greater difficulties of drying and preservation as Herbarium specimens than the Orchidaceae and this imparts to life-like representations, such as these plates, immense value as documentary evidence. In practically every case the plant selected for illustration was a well-grown, normal and typical specimen of its kind, another valuable consideration. The selected plant of *Cephalanthera ensifolia* (Plate 4) with its very strict and ungraceful habit, and unusually broad leaves, does not appear to me to be a happy representation of our beautiful British plant and this plate alone does not give complete satisfaction. This plate, it may be observed, is taken from the earliest of all Mrs Godfery's drawings here reproduced, and is dated March 31st, 1908. Any criticism, however small, of these coloured plates is offered with the utmost reluctance, as the general standard of excellence is so high that the slightest divergence is immediately conspicuous.

The coloured plates are reinforced by 10 monochrome plates and 11 text figures of equal merit. The majority of the monochrome plates are reproductions of photographs of living plants and are very valuable taken in conjunction with the coloured drawings. Especial mention should be made of the four plates of Professor Pfeiffer-Wellheim's stereographs, 24 in all. These must be looked at through a stereoscope for a proper appreciation of their beauty and value.

Turning now with reluctance from the illustrations to the consideration of the letterpress, the first 36 pages are more or less an introduction to the remainder of the work. This introductory portion comprises seven Chapters dealing in turn with a general introduction to the Orchidaceae for the benefit mainly of non-botanical readers, the evolution of the Orchid flower, the evolution of genera and species, pollination and fertilisation, the life of an Orchid, hybridism and nomenclature.

The second great feature of this book is the prominence given by Colonel Godfery to the consideration of the evolution of the Orchid flower, the evolution of the genera of the Orchidaceae, and the construction of a rational taxonomic arrangement based upon his conception of that evolution. It is generally admitted that the Orchidaceae are derived from an ancestor having a regular six-anthered liliaceous flower. The present Orchid flower has been evolved by suppression of certain of these anthers, whose former existence is occasionally manifested by cases of pelory, flowers with two or three lips and other phenomena of a similar nature. Colonel Godfery advances a theory which provides a satisfactory explanation of the two great divisions of the Orchidaceae, the sub-families Diandrae with two fertile anthers and Monandrae with one. It is suggested that both may have been derived through the Apostasiaceae. This family was formerly included by R.

Brown and other authorities in the Diandrae, no doubt owing to the type genus *Apostasia* having two fertile anthers (a_1 and a_2) but with a third anther (A_1) appearing in some species as a staminode. Lindley, however, and H. N. Ridley considered the Apostasiaceae to be a distinct family. Subsequently the Apostasian genus, *Neuwiedia*, was discovered with three fertile anthers, which confirmed the separation of the Apostasiaceae from the Diandrae. The three fertile anthers of *Neuwiedia* are A_1, a_1 and a_2, that is to say, it combines the one fertile anther (A_1) of the Monandrae with the two fertile anthers (a_1 and a_2) of the Diandrae. By suppression of the anther A_1 the Diandrae are evolved through the intermediate step of the genus *Apostasia*, in which this anther sometimes appears as a staminode and is sometimes suppressed altogether; on the other hand, by reduction of the anthers a_1 and a_2 to staminodes the structure of the Monandrae is evolved from *Neuwiedia* direct.

Only one genus of the Diandrae is represented in Britain, namely, *Cypripedium*: the remainder, 20 genera, according to Colonel Godfery's arrangement, all belong to the Monandrae. The most ancient and primitive genus of the Monandrae represented in the British flora is assumed to be *Cephalanthera*, which therefore figures in Colonel Godfery's arrangement next after *Cypripedium*. This is a departure from the view previously expressed by him that *Cephalanthera* was a case of degeneration, having descended from cross-fertilisation to self-fertilisation. It is now shown that *Cephalanthera* is not only so constructed that it can be and is cross-fertilised but also it is the only genus represented in Britain which lacks the rostellum, an organ which ensures the transportation of pollen from one flower to another by providing the mechanism for attaching the pollinia to visiting insects by means of a viscid secretion which quickly sets hard like cement. *Cephalanthera* alone provides for the visiting insect to remove the pollinia by means of viscid fluid acquired direct from the stigma before reaching the pollinia. Colonel Godfery's theory of the evolution of the Monandrous genera is based on the progressive elaboration and perfecting of the rostellum. This evolution is illustrated in the British genera by the simple naked rostellum of *Epipactis*, passing through numerous intermediate stages of development, till the highest form of rostellum is reached in *Ophrys*, in which the base of each pollinium is separately enclosed in a hinged pouch which keeps the liquid from the air and in a viscous state. It is estimated that the Monandrae contain more than 500 genera and as there are many parallel lines of evolution it is clear that the British genera cannot show a continuous evolutionary sequence, but the order in which Colonel Godfery proposes to arrange the genera is intended as far as is possible to follow the sequence of the evolution of the rostellum from the simplest to the more elaborate forms.

Cephalanthera is the first genus of the tribe Neottiae, which also contains *Epipactis*, *Goodyera*, *Spiranthes*, *Neottia* and *Listera* in five sub-tribes, the last two genera belonging to the same sub-tribe Listerinae. These two genera, in fact, might well be united as their structure is identical, but *Neottia* is maintained as a distinct genus on account of its saprophytic habit. *Goodyera* occupies the position of a sort of junction between several lines of descent, having the hinged lip of *Epipactis* and the habit of *Spiranthes*, while the pollen packets bound together by elastic threads and the detachable viscidium form a very definite advance in the direction of the more highly organised Ophrydeae.

The three genera *Malaxis, Liparis* and *Corallorrhiza* form the tribe Malaxideae, which is distinguished by having waxy pollinia, while *Epipogon* is the sole genus representing the tribe Epipogoneae. This genus again occupies the position of a link, having the rhizomatous rootstock of *Corallorrhiza* on the one hand, while on the other the pollinia on caudicles, the large heart-shaped rostellum and the distinctly ornamental large-spurred flower are all characters which show an advance in the direction of the Ophrydeae.

All the remaining British genera fall within the great tribe Ophrydeae, being subdivided into two sub-tribes, the Gymnadeniinae and the Serapiadinae, distinguished by having the viscidia respectively not enclosed or enclosed in a pouch to keep them moist. The first sub-tribe includes the four genera *Herminium*, *Coeloglossum*, *Platanthera* and *Gymnadenia*. The last three have been placed by many authors in the genus *Habenaria*, but it is shown that this name must be restricted to species having projecting stigmatic processes. *Herminium* is most ingeniously organised for pollination by the attachment of the viscidia to the leg-joint of minute insects. *Platanthera* and *Gymnadenia* differ from *Coeloglossum* among other ways in having long spurs secreting free honey, while one of the principal points of distinction between *Platanthera* and *Gymnadenia* is that the latter has a 3-lobed anther, on the lateral lobes of which are situated the stigmas.

The second sub-tribe comprises 6 genera, *Neotinea* (which has also at times been included in *Habenaria*), *Anacamptis*, *Himantoglossum*, *Aceras*, *Orchis*, and *Ophrys*. The first two are quite clearly connecting links between *Gymnadenia* and *Orchis*, *Neotinea* being derived through *G. albida* while *Anacamptis* is nothing but a *Gymnadenia* with the viscidia enclosed in a pouch, though the prominent guiding plates of the lip are a sufficient character by which it is differentiated sharply from *Orchis*. *Himantoglossum* is kept separate from *Aceras* and *Orchis* on account of the pollinia being attached to a single viscidium. It is shown that in *Aceras*, contrary to the belief of many authorities, the pollinia are attached to separate viscidia and can be separately withdrawn. *Aceras* is therefore very closely related to *Orchis*, and is indeed only distinguished from that genus by a more or less artificial character, the absence of a spur. This very close relationship is emphasised by the presence of Coumarin, a substance smelling of Woodruff, in the leaves of *Aceras* and also in those of *Orchis simia* and its allies. In *Orchis* the pollinia are attached to separate viscidia enclosed in one pouch, while in *Ophrys* we reach the highest development of the rostellum with the viscidia enclosed in separate pouches. This high development of the rostellum in *Ophrys* is allied to a unique method of attracting insect visitors, namely that of sexual appeal by attracting the males of certain insetcs by mimicry of the females.

I have dealt at undue length with Colonel Godfery's theory of the evolution of the genera of the Orchidaceae and can only plead in defence that this theme as developed by him is of the most absorbing interest and worthy of the closest attention, but owing to the unavoidable high cost of such a Monograph it may, it is feared, be beyond the reach of many would-be students. Colonel Godfery, moreover, has provided a taxonomy of our British genera and species, which differs from any arrangement which will be found in any list or text-book, British or Continental. This arrangement, however, is rational and carefully worked out along the lines of probable evolution.

The course of evolution postulated by Colonel Godfery is supported in other directions. It is surely more than a coincidence that the roots of the highly developed Ophrydeae are fungus-free tubers while in the case of all the less-developed tribes the roots are rhizomatous or simple monostelic growths infected by fungoid organisms. Again, it may be asserted with confidence that the most primitive type of plant will have the most widely dispersed geographic range. Ancient genera, such as *Cephalanthera*, *Goodyera*, *Spiranthes*, *Malaxis* and *Corallorrhiza* are to be found in America as well as in Europe, *Spiranthes* indeed actually extending as far as Australia. The Ophrydeae, however, with few exceptions, are confined to the temperate regions of the old world and the most highly developed genus of all, *Ophrys*, is practically confined to the Mediterranean basin. The exceptions are in the case of *Gymnadenia*, definitely one of the more ancient Ophrydean genera, *G. albida* being found in Greenland and allied forms in Eastern North America, and in the case of *Orchis*, of which three species are known in America, but these form a distinct section of the genus and have been placed by some authorities in a separate genus.

The question of Nomenclature is not dealt with at all exhaustively in this Monograph. This will no doubt be a matter of relief to many of its less scientifically-minded readers. The author is in favour of the retention of names which are generally used and understood, rather than the strict adherence to priority of date. The fact that he ignores Miller's *Gardeners' Dictionary* leads to further divergence from the standard British lists, *Ophrys aranifera*, for instance, being adopted in preference to *O. sphegodes*. As might be expected, *Epipactis* is referred to *Helleborine*, while it has already been pointed out that Colonel Godfery maintains the genera *Coeloglossum*, *Platanthera*, *Gymnadenia*. *Neotinea* and *Himantoglossum*. The inclusion of *G. albida* in *Gymnadenia* is a departure from the usual practice, both British and Continental. Colonel Godfery gives reasons to show that there is no necessity for the maintenance of either *Leucorchis* or *Bicchia* to include this species.

The question of pollination and fertilisation is exhaustively dealt with, not only in the Introductory Chapter IV, but in the enumeration of genera and species, the particular methods adopted in the case of each species being individually dealt with at great length. The description of the varied methods employed derive great value from the detailed observations of Colonel Godfery and other helpers and are supplemented by lists of insects which have been observed to visit the various species, the insects in many cases being figured in the coloured plates. This, except in isolated instances, has not been previously attempted and opens up a whole field of possibilities for observers with the necessary skill and patience. To take but one example of the many possible observations still waiting to be undertaken, *Ophrys aranifera* is known to be cross-fertilised freely, but no insect visitor to this species has yet been watched and identified.

The cytology of the Orchidaceae is alluded to briefly on p. 4. From what is at present known it appears that cytological investigation is not going to give the hoped-for assistance in connection with the more critical groups of the Monandrae. It is stated that many species and hybrids of the genera *Orchis*, *Anacamptis* and *Gymnadenia* have 10 chromosomes. This agrees with the rather negative result obtained by a worker at Cambridge last year to whom I sent plants of *Oo. incarnata*, *praetermissa*, *maculata* and hybrids. He reported that the chromosome number was the same in every case examined, 20. No doubt the correct chromosome number should have been reported as 10, the figure 20 representing 10 pairs of chromosome-halves.

The remainder of the Monograph is devoted to an enumeration and description of the British genera and species. Keys are given, together with the distinctive characters of the sub-families, tribes, sub-tribes, genera and species. A fully detailed description is given of each species—in English, and made from living specimens. Then follow in every case descriptions of forms and varieties, an account of the habitat and distribution both in Britain and abroad, a short synonymy, and finally a detailed description of the method of fertilisation adopted by the species, the action of the rostellum and other organs and the names and behaviour of insect visitors. With regard to the synonymy, this is admittedly incomplete, only such names having been included as would be likely to interest British readers. In the case of *Coeloglossum viride* the synonymy has, presumably by accident, been omitted entirely. The account of the distribution in Britain is also incomplete and except in one or two instances is only given in general terms, no attempt being made to enumerate the vice-counties in which species have been found. The inclusion of a short account of the distribution of our native species abroad is of value.

As is only to be expected as the result of such an exhaustive work, there are a number of new varieties and forms added to the British list, but it is not possible here to do more than to call attention to a few of the more striking additions and alterations and to Colonel Godfery's treatment of the critical groups.

Epipactis purpurata Sm. is stated to have been based on a single, very highly coloured specimen and the name is retained as a variety of the species *violacea* Dur. Dug. It is suggested that this high coloration may be due to extreme saprophytism.

Gymnadenia densiflora Lindley is treated as a sub-species of *G. conopsea*, and a forma *monensis* of the sub-species is described as having darker flowers and shorter stature. The description of *densiflora* agrees very closely with specimens which I have found in wet situations in South Hampshire.

The British form of *Orchis simia* is now described as var. *macra* (Lindley), differing from the Continental type in its darker and more grey-green leaves, more cylindrical spike, bluer lip-segments and broader mid-lobe with small spots, and whiter spur. The British plant was originally described by Lindley as a species *O. macra* and his name is retained for the variety.

Orchis morio L. The variety *Bartlettii* Heslop-Harrison, with flowers of only half the linear dimensions of the type, is retained, but no mention is made of the corresponding large-sized variety, *Churchillii* Dr.

O. incarnata L. The var. *pulchella* Dr. is retained, being referred to as a colour form. It is perhaps of higher rank than this but its exact value is difficult to assess. Where *O. incarnata* occurs on basic soils, examples of plants practically identical with this variety will occur among the type. On acid soils, however, *O. incarnata* is represented solely by the variety; no individuals of the type will be seen or any other variety except occasionally albinos. This seems to indicate that the true status of this plant may be nearer that of a race or subspecies.

Var. *dunensis* Dr. is also retained, together with a new form *atrirubra*. This hardly seems to merit being distinguished from *dunensis* except to form the subject of a charming portrait!

The other marsh orchids, *praetermissa* and *latifolia*, form, with their northern allies, *pulchella* and *purpurella*, a complex group which it is convenient to consider together. To them is now added a new variety—*latifolia*, var. *eborensis*. (Incidentally it may be remarked that *eboracensis* would seem to be the correct Latin adjective to indicate connection with York and Yorkshire). The problem of the relations of the members of this group to one another is not solved by Colonel Godfery but much food is provided for rumination. It is made evident that *praetermissa* and *latifolia* are closely related species: for one thing their seeds are very alike, and further, Colonel Godfery recounts the discovery on the Continent of isolated specimens very closely resembling *praetermissa* among colonies which were composed of *latifolia* and no other species. Dr Stephenson has said that *pulchella* and *purpurella* are also closely related, *purpurella* being a dwarf plant with leaves which are more often than not spotted, while *pulchella* is a taller plant with unspotted leaves. On the evidence of the seeds alone these two plants are distinct but from other evidence it appears that it may be necessary to unite them. Dr W. A. Sledge sent me in 1932, from Walney Island, plants which agreed with *pulchella* in their tall habit and general appearance, but specimens occurred with both spotted and unspotted leaves. Plants from Anglesey, which have been referred to *purpurella*, do not appear to be distinguishable from the Walney plants. Turning to the new *eborensis*, Colonel Godfery says of it—" It certainly is not *O. incarnata*, *maculata*, *praetermissa*, or *purpurella* . . . it does not appear to be a hybrid. It must therefore either be a new species or a form of *latifolia*." Two of the characteristics of this plant are its dwarf habit and early flowering. As far as is possible to judge from an excellent photo, *eborensis* is identical with plants gathered in 1931 by Dr Sledge at Kilnsey which were passed by Dr Stephenson as *purpurella*, but these Kilnsey plants did not exhibit the character of early flowering. It is perhaps significant that though *eborensis* is described as a variety of *latifolia* it is printed not after that species but following *purpurella*. It may further be pointed out that Dutch botanists recognise a form of *latifolia—majalis*, which is characterised among other things by dwarf habit and early flowering; moreover, Dutch botanists have confounded this plant with *purpurella*. Colonel Godfery has christened this plant in English " The Mystery Orchid." Its publication has certainly not lessened the mystery surrounding the northern forms of marsh orchids whose position between *praetermissa* and *latifolia* still awaits explanation.

Under *O. praetermissa* mention is not made of the fairly frequent occurrence of this species on Chalk Downs.

O. maculata L. If it is granted that Linnaeus' name belongs to the form called *O. Fuchsii* by the late Dr Druce, then the arrangement adopted for this species is probably the most natural and convenient to be found. Colonel Godfery recognises four forms under this species as follows:—

I. The type, which he considers to be the woodland plant.
II. Sub-species *elodes* (Gris.), with var. *macroglossa* (Dr.) under it.
III. Var. *trilobata* Bréb.
IV. Var. *O'Kellyi* (Dr.), with the reservation that this variety may be no more than albino III.

The method of treating one of the two main forms as a sub-species of the other rather than granting them both equal rank as species is in my opinion satisfactory, if the Linnean name must be retained for one of them. But as it is doubtful whether the real meaning of the Linnean name, *maculata* L., will ever be capable of an explanation universally acceptable, the better plan would be to give them both the rank of sub-species under the aggregate species, *maculata* L.

In connection with the hybrids of *O. maculata* L., Dr W. A. Sledge has called my attention to the fact that some of the hybrids named by Druce have been incorrectly cited. For example, on p. 214, to say " *O. maculata* × sub-sp. *elodes* = × *O. transiens* Dr." is not strictly accurate. *Transiens* was described by Druce as *Fuchsii* × *maculata* and although Col. Godfery is referring to the same hybrid plant, he should, if he proposes to use Druce's name, cite it as *transiens* (Dr.), comb. nov. The same remark would apply to ×*O. Hallii* Dr. and ×*O. Mortonii* Dr., which were described by Druce as *maculata* × *praetermissa* and *Fuchsii* × *praetermissa* respectively, Druce's "*maculata*" corresponding to Godfery's "*elodes*."

In Ophrys, as has been already stated, *aranifera* is preferred to *sphegodes* and the var. *fucifera* is no longer maintained. *Arachnites* is also adopted in preference to *fuciflora*. With regard to *O. apifera*, attention is called to the fact that the British and Continental forms differ somewhat, the former having long lateral petals and possibly being var. *aurita* Moggridge. Under it are placed three varieties—*Trollii*, which is certainly correctly reduced from specific rank, indeed it is quite possibly only an abnormality; *albida*, the existence of which was pointed out in the 1930 Report of this Society, and *chlorantha*.

The Monograph is well provided with Indices and concludes with a full Bibliography, a glossary of the technical botanical terms employed, an Index of Plates and a general Index

An entire absence of misprints is not to be expected in a work of this magnitude. There is one such which is of considerable importance. On page 188 Linnaeus, writing in the 2nd Edition of the *Flora Suecica* of *O. incarnata*, is quoted as follows:—" Praecedenti (*i.e.*, 801 *latifolia*) simillima, a qua differt. Foliis pallide viridibus immaculatis; nec saturate viridibus immaculatis." The second " immaculatis " should of course read " maculatis;" were the quotation correct as printed it would be completely inconsistent with the arguments advanced by Colonel Godfery for applying Linnaeus' name *latifolia* to a plant with spotted leaves, and it would in fact be a strong argument for those who follow Rolfe in applying this name to the plant called by Druce *praetermissa*.

There is one other error of slight importance. Figures 4 and 6 on the monochrome Plate G. have been transposed, with the result that the plants photographed have been in each case given the name of the other. There are, in consequence of this mistake, incorrect references on pp. 188, 189 and 191 (twice).

The other misprints which I have been able to detect are quite unimportant but are given here in the interests of accuracy. They are as follows:—

On pp. 131 and 132 the references to figure 4 of Pl. 22 should be to figure 5 of that plate.
On p. 144 the reference to Pl. 28A should be to Pl. 28, figs. 4 and 5.
On p. 168 the reference to Pl. 34A, fig. 1, should be to Pl. 35, figs. 2 and 3.
On p. 181 the reference to *O. morioides*, Pl. 40, should be to p. 179 and not 159.
On p. 217 the reference to p. 188 should be to p. 201.

Members of this Society will be glad that the work of the late Dr Druce on the Orchidaceae receives full recognition in this Monograph. Although their respective views on many points of nomenclature were quite irreconcilable, the respect which the author has for Dr Druce's authority is made evident by the maintenance of many of his specific and varietal names and in other ways. As would be expected by those who are privileged to know Colonel Godfery, he acknowledges, perhaps too fully, his indebtedness to the work and help of others at the expense of his own original researches. He is to be most heartily congratulated on the successful completion of a life-time's work and the production of a masterpiece. His publishers, too, deserve our thanks for their vision and courage in undertaking the publication of such a book in these times of financial stringency, as well as our admiration for the splendid technique necessary for such a publication and especially for such colour-printing.

OBITUARIES.

Dr John Isaac Briquet died at his home in Geneva on October 26, 1931, at the age of 61. His name is intimately associated in the minds of British botanists with his many attempts, extending over more than a quarter of a century, to bring about unanimity in drawing up the rules governing botanical nomenclature. At the International Botanical Congress at Cambridge in 1930, this crowning aim was achieved and his untimely death so soon after, came as a great shock to his many admirers and friends, but unfortunately, somewhat delayed the publication of the results. The degree of Doctor of Science—*honoris causa*—was conferred upon him by the University of Cambridge on the occasion of his visit to the Congress in 1930.

Dr William Garnett, formerly Principal of the Durham College of Science, Newcastle-upon-Tyne, and subsequently educational adviser to the London Technical Educational Board, 1893-1904, and London County Council, 1904-1915, died on November 1, 1932, aged 81 years.

Prof. Karl Ritter von Goebel, of the University of Munich, died on October 9, 1932, at the age of 77 years. He was undoubtedly the foremost living authority on plant morphology, and his *Organographie der Pflanzen* was a great achievement. His more critical subsequent writings have long been regarded as indispensable by those engaged in morphological investigations and have very greatly influenced the direction of enquiry pursued. He paid frequent visits to this country, had an intimate knowledge of our language, and was always a great favourite with British botanists, both on account of his work and of his charming personality.

Mrs Eliza Standerwick Gregory, the author of *British Violets*, published in 1912, died at Weston-super-Mare on March 22, 1932, at the age of 91. In the Preface to that work she acknowledged that " Much, perhaps most, of my inspiration and enthusiasm for botanical study was derived from two friends, James Walter White and David Fry." Mrs Gregory specialised in the study of the *Nominium* section of the genus *Viola* and in the Botanical Gardens at Cambridge grew and studied the life-histories of plants received from collectors. She rendered very valuable service for many years in acting as referee of plants in this section sent in for distribution. Her herbarium was presented to the British Museum, Cromwell Road, in 1919.

Gustav Hegi, the author of the *Illustrierte Flora von Mittel-Europa* of recent publication, died in Switzerland during April 1932, aged 56 years. He studied at the University of Zurich and graduated in 1900.

His special studies were Systematic Botany and Plant Geography; he was therefore well equipped by these and innumerable botanical excursions with his students for the great work of his " Flora " which occupied twenty-four years in production and is a lasting monument to his name.

Symers Macdonald Macvicar, the talented author of *The Student's Handbook of British Hepatics*, passed away at Invermoidart, Acharacle, Loch Shiel, on February 27, 1932. An admirable obituary notice of his work and personality appeared in the *Journal of Botany* for September 1932. All botanists who have studied these plants will agree that his Handbook " has done more to popularise and facilitate the study of these difficult plants than any other which has been published in this country." I should like to add my personal testimony to that of the notice in question as to the willingness of Dr Macvicar to help other students with advice and specimens.

Leonard Goodhart Sutton, senior partner in the world-famed firm of Sutton & Sons, Reading, died somewhat suddenly on June 13, aged 68. Although he possessed a most comprehensive and critical knowledge of grasses, he is perhaps best known for his work on the evolution of improved forms of garden annuals. He was President of the Council of the University of Reading at the time of his death and took a keen interest in all educational work.

Prof. Roland Thaxter, of Harvard, died on April 22, at the age of 73 years. He graduated at Harvard University in 1882, and was appointed mycologist at the Connecticut Experimental Station in 1888. He became Professor of Cryptogamic Botany at Harvard in 1901. On his retirement in 1919 he acted as honorary curator of the Farlow Herbarium. His association with Prof. W. G. Farlow resulted in the building up of a school of cryptogamic botany and a herbarium which are unrivalled in their own sphere. Prof. Thaxter ultimately succeeded Prof. Farlow as American editor of the *Annals of Botany*, and it is in this connection that he is, perhaps, best known to British botanists.

James Walter White. By the death of this eminent botanist on 26th October 1932, at the full age of 86, field botany loses one of its most distinguished exponents, and his many friends a genial and inspiring personality.

Born in London on 8th August 1846, his early boyhood was spent at Dorchester, where his education was undertaken by William Barnes, the Dorset poet, for whom he always expressed great admiration.

At the age of 14 White was apprenticed to Mr T. B. Groves, a chemist of Weymouth, and there coming under the influence of W. Bowles Barrett, a local botanist, his life-long interest and work on the British Flora began. The rich flora of Portland and the Dorset coast gave him many opportunities, and he quickly formed a herbarium, and also competed for and gained the silver medal offered by the Pharmaceutical Society for the best collection of wild flowers.

His apprenticeship over, he went to London and became an assistant in the firm of Messrs Allen & Hanbury, and received much kindness and encouragement from Mr Daniel Hanbury, who often invited him to spend week-ends at his home in Surrey.

In 1871 White married Miss Mary Naldrett, of Horsham, Sussex, and about the same time was offered a partnership in Clifton, Bristol, with an old-established firm of chemists, now known as Giles, Schacht & Co. As partner after partner passed away he gradually took sole control of the business, although his name never appeared, and on his retirement after the War its management was undertaken by three of his sons.

Soon after settling in Clifton, White joined the Bristol Naturalists' Society, then in its infancy, and during his 54 years' membership gave valuable services to the Botanical Section, holding the office of Secretary for over 30 years. From 1907 to 1909 he was President of the Society. He organised Saturday afternoon rambles and by that means got together a loyal band of helpers who contributed largely to his knowledge of the vegetation of one of the richest botanical areas in Great Britain.

In response to a request by the Society, he began in 1881 to compile an account of the local flora which, after appearing in yearly parts in the *Proceedings*, was published in book form in 1886 by the Society as *The Flora of the Bristol Coal-field.* This proved the ground-work of his monumental *Flora of Bristol*, published in 1912, which has been justly recognised as a model for future local and county floras. It deals with a country which extends roughly 720 square miles, with Bristol as its centre, about one-third lying in West Gloucester, the remainder in North Somerset. The records are not mere lists of localities, but specify the kind of ground in which to search without in any way making it too easy to discover the plant. The 700 pages are enlivened throughout by helpful, and at the same time human, touches which make the book acceptable not only to the " practised botanist " but " to those good people . . . who love wild flowers in a cursory, superficial way and . . . would willingly learn more respecting the natural riches that surround them."

For 30 years White had devoted himself assiduously in the leisure moments of an exacting business career in exploring the district more thoroughly, on foot, on bicycle, and still later by car, and in examining herbaria for local records.

The masterly account of the history of Bristol Botany, which forms the introduction to his book, meant much research into the literature of earlier workers, a task congenial to one who had high ideals of literary expression.

When the British Association visited Bristol in 1898 White wrote the article on " The Botany of Bristol " for the handbook, and on the next visit in 1930 he revised the article, adding an account of the many new plants which had been discovered in the interval. No handbook, how-over, was issued by the Association, and the article was published in the *Proceedings of the Bristol Naturalists' Society* for 1930.

He did not contribute much to scientific journals, and although scattered in the pages of the *Journal of Botany* from 1880 to 1929 there are more than 40 communications written by him, they are mostly short notes or additional records to his Flora. One paper, however, published in 1884 on *Lithospermum purpureo-coeruleum* drew attention to a phenomenon on the growth and propagation of the plant which had never been previously observed or recorded.

White did not specialise on any particular group—his knowledge of plants was cosmopolitan—but the study of the Brambles specially appealed to him, and his work amongst the Rubi of the Bristol district has helped to elucidate problems in the identity of certain species. As a contemporary of Briggs, Babington, Rogers, and Focke, he noted great advances in our knowledge of the genus and with his friend, David Fry, contributed in no small way to this progress by his own researches. His views about *Rubus argenteus* (*Fl. Brist.*, p. 272) show that he and Fry recognised two distinct brambles that had been until recently classified under one name. He proposed also (p. 275) as distinct species several brambles, which his contemporaries had described as varieties or subspecies and in doing so he anticipated the later work of British and Continental botanists on the genus.

Many sheets in the *Set of British Rubi* were gathered by White around Bristol and are excellent examples of how to collect plants at the most favourable stage of their development and dried in such a way as to preserve their natural colours.

He always hesitated to add new species, and is therefore only responsible for describing two new forms:—*Rubus Bucknalli* named after Cedric Bucknall, his constant companion in the field, who detected it on a spur of the Cotswolds, and *Rubus Naldretti*, a variety of *R. mutabilis* from St Leonard's Forest, Sussex, named in honour of his wife.

White was a valued member of the two British Botanical Exchange Clubs and a great contributor. He joined this Club as far back as 1882 and there must be but few private herbaria without sheets of his beautifully prepared specimens. He acted as distributor in 1900, 1905, and 1919, and often wrote helpful notes for the Reports.

He never sought recognition of his work, but it gave him great pleasure when the University of Bristol conferred upon him in 1927 the honorary degree of M.Sc. Many years previously he had been appointed special lecturer in systematic Botany at the University, but as teaching did not appeal to him his services were given in helping students in their individual work.

He joined the Linnean Society in 1889, but he rarely attended the meetings and was only known to present day botanists through correspondence and by his ever-ready help in supplying their desiderata with fresh or dried plants. He always encouraged the beginner and tried to impress upon the rising generation of botanists the necessity of making observations in the field, thus taking the place of those field botanists who were gradually being forced to cease their work.

His botanical activities were not confined to the British Isles, for he travelled in France, Spain, Italy, and the Balearics on many occasions with his friend Bucknall, and thereby got together an exceptionally good European herbarium, further enriched by specimens procured through exchange with Dörfler of Vienna and others. This and his British herbarium have been bequeathed by will to the University of Bristol.

In spite of some months of suffering and discomfort he continued to take a keen interest in plants up to a few days before his death, and it was the privilege of the writer to see him during one of these and to discuss with him the identity of a puzzling Mint which he had recently gathered.

His wife and seven sons and four daughters survive him.

IDA M. ROPER.

NEW COUNTY AND OTHER RECORDS.

In future this Section will include only the records of British plants whose names are given in the *Comital Flora*. To avoid duplication, no records published under Plant Notes will be reproduced here. That Section will be confined to the records of plants whose names are *new* to the *British Plant List*. A separate Section will include the names of Aliens and Casuals not given in the *Comital Flora*.

No county record for any species belonging to a critical genus will be published without a voucher given by a recognised referee.

Where several records for the same species are given, the star applies only to the single record immediately following it. *Varieties will not be starred.*

The labels of all records should give not only the county but also the correct number of the vice-county. This latter number is most essential, and great care should be taken in ascertaining it. In any case of doubt the Secretary will be pleased to answer enquiries.

Abbreviations.—† = Adventive; * = New County Record; ! placed after a plant signifies that the compiler has seen a specimen; ! placed after a locality that the compiler has seen it there; × placed between two scientific names or before a binomial means that the plant is a hybrid; numbers following a county, refer to the vice-county in *Topographical Botany*; [] enclosing a record mean that confirmatory evidence is needed.

We have to thank Mr A. J. Wilmott, Mr J. S. L. Gilmour, Dr W. B. Turrill, Dr W. A. Sledge, Dr E. Drabble, Mr W. O. Howarth, Mr J. Fraser, Lt.-Col. A. H. Wolley-Dod, Mr P. M. Hall, Rev. H. J. Riddelsdell, Mr W. C. Barton, Dr F. W. Stansfield, Mr J. E. Little, Dr R. W. Butcher, Mr A. E. Wade, Mr W. Watson, Mr H. W. Pugsley and others who have not only rendered valuable critical assistance but have shown willingness to help in other directions.

We are also much indebted to the following foreign botanists for their determinations in critical genera:—Prof. O. E. Schulz, Dr K. Ronniger, Dr E. Almquist, Dr P. Aellen, Prof. B. H. Danser, Dr H. Dahlstedt, Dr F. Jaquet, Dr K. H. Zahn, Dr H. Schinz and Dr G. Kükenthal.

*2/2. Thalictrum minus L. Plumpton, E. Sussex. A rock garden was made 3 or 4 years ago with soil and sand from a neighbouring sand-pit. Since then this species has appeared regularly each year, Lewis A. W. Burder.

4/1. Adonis annua L. Near Winchester, S. Hants, Rt. Hon. H. T. Baker; *Rowde Court, N. Wilts, Miss P. Leake.

6/4. RANUNCULUS AURICOMUS L., approaching var. INCISIFOLIUS Reichb. Near Chiddingford, Surrey, G. M. ASH.

BATRACHIAN RANUNCULI, teste W. H. PEARSALL.

6/20. R. FLUITANS Lam. River Wye at Symonds' Yat, Hereford, Miss E. S. TODD.

6/24. R. HETEROPHYLLUS Weber. Chailey Common, E. Sussex, Miss E. S. TODD.

6/24 c. R. HETEROPHYLLUS Weber, var. SUBMERSUS Bab. Salt marshes, near Cliffe, West Kent, J. E. LOUSLEY.

6/25 c. R. PELTATUS Schrank, f. ELONGATUS (Hiern). Basingstoke Canal, near Byfleet, Surrey, J. E. LOUSLEY.

6/26 b. R. PSEUDO-FLUITANS Baker & Foggitt, var. MINOR Pearsall. River Loddon, near Loddon Bridge, Berks, J. E. LOUSLEY; Foxcote, E. Gloster, Miss L. ABELL.

*6/27. R. SPHAEROSPERMUS Boiss. & Bl. River Kennet, near Marlborough, N. Wilts, J. D. GROSE.

6/30. R. LUTARIUS Bouvet. Small pond near Brockenhurst, S. Hants, Miss E. S. TODD.

17/1. BERBERIS VULGARIS L. Lane near Faringford leading to Tennyson's Down, Freshwater, I. of Wight, Rev. E. C. CRUTTWELL.

†21/1. PAPAVER SOMNIFERUM L. Waste ground, Slough, Bucks, H. PHILLIPS.

21/2 c. P. RHOEAS L., var. PRYORII Dr. Gravel-pit, Letchworth, Herts; Slough, Bucks, H. PHILLIPS.

21/6. P. HYBRIDUM L. Near Fleam Dyke, Cambs, H. PHILLIPS.

†23/2. GLAUCIUM CORNICULATUM L. Alien. Many plants in the tip at Folkestone, E. Kent, Miss E. S. TODD.

32/10 d. FUMARIA OFFICINALIS L., var. WIRTGENII Haussk., teste PUGSLEY. Near Lambridge Wood, Henley, Oxon, J. CHAPPLE. Specimens are distributed this year.

33/1. MATHIOLA INCANA Br. Cliffs between Freshwater and Compton Bays, and a white variety below St Catherine's Point Lighthouse, I. of Wight, Rev. E. C. CRUTTWELL.

35/3 d. NASTURTIUM AMPHIBIUM Br., var. AURICULATUM DC. emend., teste SCHULZ. Woodwalton Fen, Hunts, H. PHILLIPS.

36/3. BARBAREA VULGARIS R. Br. Wood, Milford, and Lower Birtley Farm, Witley, Surrey, G. M. ASH.
Var. b. CAMPESTRIS Fr. West Wood near Milford, Surrey, G. M. ASH.

*36/4. B. ARCUATA Reichb. Arable field near Chiddingford, Surrey, G. M. ASH.

36/5. B. INTERMEDIA Boreau. Roadside, Churt, Surrey, G. M. ASH.

39/3. CARDAMINE IMPATIENS L. Charterhouse Copse, Surrey, G. M. ASH; Leigh, near Tonbridge, W. Kent, E. D. MORGAN.

39/4. C. FLEXUOSA With. Allotment gardens, Ottershaw, Surrey, G. M. ASH.

39/5. C. HIRSUTA L. Allotment gardens, Ottershaw, Surrey, G. M. ASH.

†42/9. ALYSSUM INCANUM L. Near Gateshead, Northumberland, v.-c. 67, G. W. TEMPERLEY, det. TURRILL; railway sidings, Burton-on-Trent, Staffs, R. C. L. BURGES.

†49/3. SISYMBRIUM ALTISSIMUM L. Burton-on-Trent, Staffs, R. C. L. BURGES; waste-land near railway, Ipswich, E. Suffolk, Rt. Hon. H. T. BAKER and Hon. Mrs JASPER RIDLEY; Evendine, Colwall, Herefordshire, F. M. DAY.

†49/4. S. ORIENTALE L. Waste ground at The Downs School, Colwall, Herefordshire, F. M. DAY.

*49/5. S. IRIO L. Near Southport, S. Lancs, Miss E. S. TODD.

50/1. ERYSIMUM CHEIRANTHOIDES L. Waste ground, Ipswich, E. Suffolk, Rt. Hon. H. T. BAKER and Hon. Mrs JASPER RIDLEY.

54/13. BRASSICA NIGRA L. Rowde, N. Wilts, Miss P. LEAKE.

54/14 c. B. ARVENSIS Kuntze, var. MEDIA Acloque, f. LONGIFLORA Lapal. Gravel-pit, Letchworth, Herts, H. PHILLIPS.

55/1. DIPLOTAXIS TENUIFOLIA DC. Along the wall of Fresh Row, St Albans, Herts, leading to the Abbey, Rev. E. C. CRUTTWELL.

(The BURSAE have been kindly determined by Dr E. ALMQUIST.)

59/2. BURSA ABSCISSA (E. At.). Letchworth, Welwyn, Herts, H. PHILLIPS.

59/9. B. DRUCEANA (E. At.). Letchworth, Wymondley, Herts, H. PHILLIPS.

59/10. B. GALLICA (E. At.). Welwyn, Herts, H. PHILLIPS.

59/15(2). B. —— species non descripta, prope LAEVIGATA E. At. Clifton, Beds; Letchworth, Berkhamstead, Hitchin, Herts, H. PHILLIPS.

59/17. B. MEDITERRANEA (E. At.). Hitchin and Letchworth, Herts, H. PHILLIPS; Rowde, N. Wilts, G. C. DRUCE and Miss P. LEAKE.

59/20. B. PATAGONICA (E. At.). Hitchin, Herts, H. PHILLIPS.

59/20(2). B. PERGROSSA (E. At.). Welwyn, Hitchin, Herts, H. PHILLIPS; Benson, Oxon, 1931, G. C. DRUCE.

59/24. B. ROBUSTA (E. At.). Hitchin, Herts, H. PHILLIPS.

59/26. B. TREVIRORUM (E. At.). Berkhampstead, Herts; Clifton, Beds, H. PHILLIPS.

60/2. CORONOPUS RUELLII All. Wanborough, N. Wilts, J. D. GROSE; Mill, Huntingdon, H. PHILLIPS.

61/3. LEPIDIUM DRABA L. Waste ground, Ipswich, E. Suffolk, Rt. Hon. H. T. BAKER and Hon. Mrs JASPER RIDLEY.

61/4. L. RUDERALE L. Brixham Station, S. Devon, 1903, F. A. BELLAMY.

†61/20. L. VIRGINICUM L. Woolton, Liverpool, S. Lancs, W. CHESHER.

†61/22. L. DENSIFLORUM Schrad. Near Woolton, Liverpool, S. Lancs, W. CHESHER.

64/1. THLASPI ARVENSE L. Foxcote, E. Gloster, Miss L. ABELL.

66/1. TEESDALIA NUDICAULIS R. Br. Field near Byfleet, Surrey, G. M. ASH.

75/1. CRAMBE MARITIMA L. Sea-shore near Shoreham, W. Sussex, Rev. E. C. CRUTTWELL.

80/1. RAPHANUS RAPHANISTRUM L. Burton-on-Trent, Staffs, R. C. L. BURGES; near railway, on waste-land, Ipswich, E. Suffolk, Rt. Hon. H. T. BAKER and Hon. Mrs JASPER RIDLEY; Rowde, N. Wilts, Miss P. LEAKE.

85/1. RESEDA ALBA L. Waste ground, Letchworth, Herts, H. PHILLIPS. Sp. non vidi, 84/4 e. VIOLA RIVINIANA Reichb., var. e. VICINA (Martr.-Don.). (NEMOROSA). Knebworth Wood, Herts, H. PHILLIPS.

88/4. V. RIVINIANA Reichb. × SILVESTRIS Lamarck, var. PUNCTATA Dr. Brixham, S. Devon, v.-c. 3, F. M. DAY.

88/6 g. V. CANINA L., var. g. CRASSIFOLIA (Grönv.) Dr. Woodwalton Fen, Hunts, H. PHILLIPS.

×RIVINIANA = × V. BERKELEYI. Codicote Heath, Herts, H. PHILLIPS.

88/9. V. HIRTA L. Fleam Dyke, Cambs, H. PHILLIPS.

Var. i. PROPERA Jord. Fleam Dyke, Cambs, H. PHILLIPS.

×ODORATA, towards × V. SEPINCOLA (Jord.). Fleam Dyke, Cambs, H. PHILLIPS.

88/9. V. HIRTA × ODORATA (SEPINCOLA Jord.). Churston, S. Devon, v.-c. 3, F. M. DAY.

88/10. V. CALCAREA Greg. Fleam Dyke, Cambs, H. PHILLIPS; Brixham, S. Devon, v.-c. 3, F. M. DAY.

(The PANSIES have been kindly determined by Dr DRABBLE.)

88/14. V. CONTEMPTA Jord. *Trewoofe, W. Cornwall, R. B. ULLMAN; *near Shedfield, S. Hants, P. M. HALL; Loddon Bridge, Berks, R. B. ULLMAN and J. E. LOUSLEY; *between Newmarket and Cambridge, Cambs, P. M. HALL; *Cradley, Herefordshire, v.-c. 36, F. M. DAY.

Var. b. PATULA Drabble. Near Crookham, N. Hants, Lt.-Col. G. WATTS.

88/15 b. V. VARIATA Jord., var. b. SULPHUREA Drabble. Swanage, Dorset, R. B. ULLMAN; Amberley, W. Sussex, P. M. HALL; Wellington Heath, near Ledbury, Herefordshire, v.-c. 36, F. M. DAY.

88/16. V. CANTIANA Drabble. Sundridge, W. Kent, R. B. ULLMAN. (*Note.*—The *Comital Flora* incorrectly gives v.-c. 15 instead of v.-c. 16.)

*88/17. V. MONTICOLA Jord. Horndean, S. Hants, P. M. HALL. (*Note.*—The *Comital Flora* gives v.-c. 11, but not 12; this should have been the other way about as *monticola* has been recorded from Odiham, N. Hants, but not previously from S. Hants.)

*88/18. V. ALPESTRIS Jord. Near Alresford, N. Hants, P. M. HALL.

88/19. V. LEJEUNEI Jord. Sundridge, W. Kent, R. B. ULLMAN; Fleet and near Crookham, N. Hants, Lt.-Col. G. WATTS.

88/20. V. LLOYDII Jord. *Near Crookham, N. Hants, Lt.-Col. G. WATTS; Mathon, Herefordshire, v.-c. 36, F. M. DAY.

88/22. V. agrestis Jord. Trevescan, W. Cornwall; Burghfield, Berks; Goring, Oxon, R. B. Ullman.

88/23. V. segetalis Jord. Rosemerrion, W. Cornwall, R. B. Ullman.

88/26. V. ruralis Jord. *Swanage, Dorset; Fleam Dyke, Cambs, R. B. Ullman.

88/28. V. Deseglisei Jord. *Bury St Edmunds, W. Suffolk, J. E. Lousley; Woodwalton Fen, Hunts, P. M. Hall.

89/4. Polygala dubium Bellynck. Gara Rock, East Portlemouth, S. Devon, F. M. Day.

95/1. Saponaria officinalis L. Field Assarts, Oxon, J. Chapple.

†96/4. Silene noctiflora L. Waste-heap, Welwyn, Herts, H. Phillips.

†96/24. S. Muscipula L. Lewes, Sussex (det. Kew), L. A. W. Burder.

100/2. Cerastium arvense L. Field between Radlett and Shenley, Herts, Rev. E. C. Cruttwell.

103/9. Sagina Reuteri Lange. ! Malvern, Worcs, Miss K. M. Simpson.

†117/8. Malva verticillata L. Compton, Surrey, F. Clarke.

†117/9. M. parviflora L. Waste ground, Welwyn, Herts, H. Phillips. Sp. non vidi.

127/2. Geranium versicolor L. *Matfield, W. Kent, W. H. Pearsall; Piltdown, E. Sussex, T.W.N.H.S.

*132/3. Oxalis stricta L.! Wood near Rowde, N. Wilts, Miss P. Leake.

133/2. Impatiens fulva Nutt. Grand Union Canal reservoirs near Tring, Herts, Rev. E. C. Cruttwell.

†*133/3. I. parviflora DC. Henfield, Sussex, v.-c. 13, and Lewes, Sussex, v.-c. 14, Lewis A. W. Burder.

†*133/4. I. glandulifera Royle. Half a mile of flower along the Tykeswater, Radlett, Herts, Rev. E. C. Cruttwell.

†152/9. TRIGONELLA CAERULEA L. Alien. Burton-on-Trent, Staffs, 1930, G. C. DRUCE.

†153/3. MEDICAGO SATIVA L. Brynmawr, Monmouth, Miss P. LEAKE.

†153/11. M. ORBICULARIS All. Lewes, E. Sussex, Miss K. PICKARD.

†154/4. MELILOTUS INDICA (L.) All. Waste ground near Settle, Yorks, H. H. STURDY and J. N. FRANKLAND.

155/1. TRIFOLIUM MEDIUM L. Bramley, Surrey, F. CLARKE.

155/11. T. STRIATUM L. Gainsborough, N. Lincs, Dr WILLOUGHBY SMITH.

*160/8. LOTUS ANGUSTISSIMUS L. ! Worthing, W. Sussex, Miss P. M. PEARSALL. N.C.R. for West Sussex, being only known in Sussex from Hastings whence there is no record since Borrer's days.

†166/4. ASTRAGALUS CICER L. Burton-on-Trent, Staffs, 1930, G. C. DRUCE.

†176/5. VICIA VILLOSA Roth. Waste heap, Welwyn, Herts, H. PHILLIPS; *waste ground near Settle, Yorks, H. H. STURDY and J. N. FRANKLAND. New to v.-c. 64.

†176/7. V. BITHYNICA L. Lewes, E. Sussex (hort.), Miss K. PICKARD.

†176/12 c. V. SATIVA L., var. c. CORDATA (Wulfen). (CORDIFOLIA Beck.). Gravel-pit, Letchworth, Herts, H. PHILLIPS; Drummore, Wigtown, 1930; Burton-on-Trent, Staffs, 1928, G. C. DRUCE.

176/13. V. ANGUSTIFOLIA (L.) Reichard. Snowdon, Carnarvon, R. C. L. BURGES.

Var. c. SEGETALIS Koch. Burton-on-Trent, Staffs, 1929; waste ground, Oxford, 1929, G. C. DRUCE.

†176/26. V. PANNONICA Crantz, var. STRIATA M. Bieb. Waste ground near Settle, Yorks, H. H. STURDY and J. N. FRANKLAND. New to v.-c. 64.

178/9. LATHYRUS APHACA L. Waste ground near Settle, v.-c. 64, H. H. STURDY and J. N. FRANKLAND. Queried in *Comital Flora*.

(The following RUBI recently collected by Mr P. G. Beak were kindly determined by the Rev. H. J. RIDDELSDELL.)

185/28. R. DUMNONIENSIS Bab. [Ref. No. Z.319]. Stems low-arching. Petals white, tinged with pink, contiguous; staminal filaments white, becoming reddish, far longer than the greenish styles. Shotover Hill, Oxford, July 30, 1932.

185/47. R. RUSTICANUS Merc. [Ref. No. A.113]. Petals lilac, styles pale or pinkish. Bampton, Oxon, July 1929. Very common. (Focke named very similar plants *R. Hyosanthus* F.).

185/67. R. LEUCOSTACHYS Sm. [Ref. No. Z.320]. Stems low-arching. Petals faint lilac or white, roundish; staminal filaments white, becoming reddish, exceeding the green styles. Shotover Hill, Oxford, July 30, 1932.

185/67. R. LEUCOSTACHYS Sm. [Ref. No. Z.321]. Stem rather tall, arching. Petals pale pink, roundish; staminal filaments white, exceeding the green styles. Shotover Hill, Oxford, July 30, 1932. Shade grown.

185/92. R. ECHINATUS Lindb. (? = DISCERPTUS P.J.M.). [Ref. No. Z.322]. Stems arching. Leaflets thick, undulate at margins. Petals rose, oval, not contiguous; staminal filaments white, exceeding the green styles. Shotover Hill, Oxford, July 30, 1932.

185/113. R. GLAREOSUS Rog. & Marsh., var. [Ref. No. Z.323]. Stems low-arching. Petals pink, oval-lanceolate, not contiguous; staminal filaments white, exceeding the reddish styles. Shotover Hill, Oxford, July 30, 1932.

185/149 k. R. DUMETORUM, and very near RADULIFORMIS Ley. [Ref. No. Z.317]. Plant rather robust, straggling over hedge. Petals pink, roundish, contiguous. Styles pink. Bampton, Oxon, July 30, 1932.

185/153. R. CAESIUS L. aggr. [Ref. No. 288]. R. CAESIUS L. ? A low, weak plant with slender glaucous stem. Petals white, roundish; styles very pale, scarcely equalling stamens. Bampton, Oxon, June 29, 1932.

(The following RUBI, mainly from Herb. Druce, were kindly determined by WM. WATSON.)

185/14(2). R. INCARNATUS P.J.M. Yately Common, Berks, Dr A. H. EVANS and J. CHAPPLE.

*185/25. R. CARDIOPHYLLUS L. & M. Boar's Hill, Berks, Dr A. H. EVANS and J. CHAPPLE.

*185/31. R. LINDEBERGII P.J.M. Greenham Common, Berks, Dr A. H. EVANS.

185/35 b. R. INSULARIS Areschoug. Naphill, Bucks, 1917, G. C. DRUCE; Coughton, Hereford, July 30, 1888, A. LEY, as *erubescens* Wirtg.;

Mitcheldean Meend, W. Gloster, August 18, 1904, A. LEY, as *leucandrus* Focke; Yately Common, Berks, Dr A. H. EVANS and J. CHAPPLE.

185/45. R. WINTERI Focke. Dingle, Co. Kerry, 1911, G. C. DRUCE; Goring Heath, Oxon, Dr A. H. EVANS and J. CHAPPLE.

185/63. R. ADSCITUS Genev. Boar's Hill, Berks, Dr A. H. EVANS and J. CHAPPLE.

*185/64. R. HIRTIFOLIUS P.J.M. Boar's Hill, Berks, Dr A. H. EVANS and J. CHAPPLE. "The true plant; not the plant described under that name in Rogers' Handbook, which is *R. sciaphilus* Lange. The panicle almost cylindrical (not evidently pyramidal), leafy almost to the apex, and the ascending ovate-acuminate appendiculate sepals are all decisive against *pyramidalis* to which it is close, and with which it has, no doubt, hitherto been confused."—WM. WATSON, *in litt.*

185/74. R. CRINIGER (Linton) Rogers. [Ref. No. 699]. West Bergholt, N. Essex, 1915, G. C. BROWN, as *Drejeri*, teste W.M.R.

185/79. R. CINEROSUS Rogers. Near Mortimer Common, Berks, 1892, G. C. DRUCE, det. as *Radula*, var. *anglicanus* by W.M.R.

185/80. R. MUCRONATUS Bloxam. Glendalough, Co. Wicklow, G. C. DRUCE, queried as *podophyllus* by W.M.R.

185/83(2). R. GELERTII Frid. Wybonbury, Cheshire, 1910, G. C. DRUCE, det. as *R. Borreri*, var. *dentatifolius* by Dr Focke.

185/84. R. APICULATUS W. & N. Four Shire Stone, E. Gloster, August 14, 1920, H. J. RIDDELSDELL, as *R. Borreri* Bell-Salt.; Ballard's Copse, Heyford, Oxon, July 16, 1919, H. J. RIDDELSDELL, as *R. Radula*, var. *Echinatoides* Rogers.

Var. b. CURVIDENS (Ley). Sark, G. C. DRUCE, det. as *Borreri*, var. *dentatifolius*, by Focke and W.M.R.; near Felyn Fawr, Bethesda, Carnarvon, August 1892, J. E. GRIFFITH, as *podophyllus* P.J.M.

Var. c. VESTITIFORMIS (Rogers). Crooked Wood, Co. Westmeath, August 6, 1895, H. C. LEVINGE, as *Newbouldii* Bab., fide E. F. LINTON. ? New to Ireland.

Var. d. RADULOIDES Rogers. Ullapool, W. Ross, 1893, G. C. DRUCE, det. as *Radula* by W.M.R.; Newbottle, Northants, G. C. DRUCE, det. as *Radula* by W.M.R.

Var. e. ANGUSTICUSPIS (Sudre) Dr. Aconbury, Hereford, September 6, 1887, A. LEY, det. as *fuscus* by Dr Focke.

185/86 b. R. INFESTUS Weihe, var. VIRGULTORUM (Ley). Boar's Hill, Berks, G. C. DRUCE; Kimbolton, Hereford, September 9, 1891, A. LEY.

185/87. R. UNCINATUS P.J.M. On pennant-grit near Keynsham, N. Somerset, August 4, 1915, J. W. WHITE, as *Borreri*. Also the sp.

from between Keynsham and Brislington, September 2, 1892. Naphill, Bucks, 1919, G. C. DRUCE; Stanford Park, Worcester, August 22, 1910, A. LEY.

185/89. R. DREJERI G. Jens., forma HOMOEACANTHA Frid. & Gelert. Bladon, Oxon, G. C. DRUCE.

Var. c. HIBERNICUS (Rogers) Sudre. Lough Gill, Armagh, 1898, G. C. DRUCE, det. as *Borreri* by Focke and W.M.R.; tall hedge to the left of the road between Bridge of Aird and Park of Aird, east of Stranraer, Wigtown, July 22, 1899, C. BAILEY, as *Drejeri* ?; Durdham Down, Bristol, W. Gloster, August 1, 1914, J. W. WHITE, as *Drejeri* G. Jens.

185/90. R. RADULA Weihe. [Ref. No. 597]. Hedgerow near Morfa Buchan Road, Portmadoc, Carnarvon, September 5, 1922, W. C. BARTON, as *oigoclados*, var. *Newbouldii* Rogers.

Var. b. ECHINATOIDES (Rogers). Cave Hill, Antrim, G. C. DRUCE, det. as *Radula* forma by W.M.R.; Woods near Wadenhoe, Northants, July 27, 1910, A. LEY, as *rudis* W. & N.

185/92. R. ECHINATUS Lindley, forma UMBROSA. Coppice, Castle Place, near Pulverbach, Salop, August 1895, R. DE G. BENSON, comm. W. MOYLE ROGERS, as *Borreri* forma.

185/95. R. NEWBOULDII Rogers. Wood, Belmont, Hereford, August 19, 1892, A. LEY, as *anglosaxonicus* Gel., and Pathside, Belmont, Hereford, September 18, 1890, A. LEY, det. as *fuscus* by W.M.R.

185/97. R. FUSCICORTEX Sudre. [Ref. No. 22]. Polperro, E. Cornwall, July 15, 1920, F. RILSTONE, as ? *Radula*; Ganarew, Hereford, August 31, 1903, A. LEY, as *divexiramus* P.J.M.

185/99(2). R. HETEROBELUS Sudre (= R. PRAERUPTORUM Rogers Essay, Journ. Bot., 301, 1892; omitted from the Handbook). [Ref. No. 596]. Portmadoc, Carnarvon, September 1, 1922, BARTON and RIDDELSDELL, as *oigoclados*, var. *Newbouldii* Rogers; Peppard, Oxon, 1911, G. C. DRUCE, det. as a form of *Griffithianus* by W.M.R.

185/100. R. BABINGTONII Bell-Salter. Tilehurst, Berks, G. C. DRUCE, as *Borreri*, untypical.

185/102. R. LEJEUNEI W. & N. North Leigh, Oxon, G. C. DRUCE, det. as a form of *setulosus* by H. J. RIDDELSDELL. "Exactly the plant figured and described by Focke in his last work."—WM. WATSON, *in litt.*

185/104(2). R. RADULICAULIS Sudre. (R. RADULA, sub-sp. SERTIFLORUS Rogers non P.J.M.). Sandhurst, Berks, G. C. DRUCE.

185/106 c. R. MUTABILIS Genev., var. NEMOROSUS Rogers. Roadside near Stourton, Somerset, August 15, 1892, R. P. MURRAY, as *fuscus* Weihe.

Var. d. REGNORUM W. Watson. Witley Ponds, Surrey, September 3, 1890, R. P. MURRAY, as *mutabilis*; Muckross, Co. Kerry, G. C. DRUCE. "Not Genevier's type, which has nearly glabrous, broad leaflets and glabrous carpels."WM. WATSON, *in litt.*

*185/109(2). R. DIVERSUS W. Watson. (R. HIRTUS, sub-sp. KALTENBACHII of Rogers' Handbook). Lambridge Wood, Oxon, J. CHAPPLE.

185/110 c. R. FUSCUS Weihe, var. HYPOSERICEUS Sudre. Troy Park Wood, Monmouth, August 18, 1910, A. LEY, as *uncinatus*; Tea Bailey enclosures, Forest of Dean, W. Gloster, August 23, 1899, A. LEY, as *uncinatus*; Arrochar, Argyll, 1898, G. C. DRUCE; Burwardsley, Cheshire, July 23, 1900, A. H. WOLLEY-DOD, as *Newbouldii* Bab.

Var. d. OBSCURUS (Kalt.). Mossbridge, S. Lancs, August 1908, J. A. WHELDON, det. as *Borreri* by W.M.R.

185/112. R. PALLIDUS Weihe. Finchampstead, Berks, 1891, G. C. DRUCE, as *infestus* Weihe, teste W.M.R.

Var. b. LEPTOPETALUS Rogers. Howle Green, Hereford, August 14, 1891, A. LEY, as *Loehri* Wirtg.

185/114. R. HORRIDICAULIS P.J.M. [Ref. No. 14]. Pendale, Perranzabuloe, W. Cornwall, August 23, 1919, F. RILSTONE, as *rosaceus* W. & N.; Hill opposite Machen, Glamorgan, August 15, 1908, H. J. RIDDELSDELL, as *oigoclados*, var. *Bloxamianus* (Colem.).

185/115. R. SCABER W. & N. Weston, Staffs, 1922, G. C. DRUCE; Atherstone Outwoods, Warwick, August 13, 1887, J. E. BAGNALL, as *Bellardi*, b. *dentatus* Blox.; *side of Lambridge Wood, Oxon, 1932, J. CHAPPLE.

185/118. R. LONGITHYRSIGER Bab. Coggs Wood, Oxon, G. C. DRUCE.

185/120. R. FOLIOSUS Weihe. Nuneham, Oxon; Silchester, Berks, G. C. DRUCE.

185/123. R. HYSTRIX Weihe. *Hyde Head, Bucks; Pishill, 1897, North Leigh, Oxon; Boar's Hill, 1895, Berks, G. C. DRUCE; near Shirley, Derby, August 1892, W. R. LINTON, as *fuscus* var.; Twelve o'clock Drive, Brandon, Warwick, September 1, 1920, L. CUMMING, as *Koehleri*, var. *cognatus* (N.E.Br.).

185/125. R. RUFESCENS L. & M. Newbottle, Northants, G. C. DRUCE.

185/126. R. POWELLII Rogers. Lambridge Wood, Oxon, J. CHAPPLE; *near Stokenchurch, Bucks, G. C. DRUCE, as *glareosus* Rogers (see *Fl. Bucks*, p. 115).

*185/131. R. APRICUS Wimmer. Heath, Bucks, G. C. DRUCE, det. as *infestus* by W.M.R.; Boar's Hill, Berks, Dr A. H. EVANS and J. CHAPPLE.

185/129. R. COGNATUS N. E. Brown. Wood near Llandogo, Monmouth, July 2, 1894, A. LEY, as *viridis* Kalt.; *Wothorp, Northants, 1911, G. C. DRUCE, as *hirtus* (see *Fl. Northants*, p. 72); Port Talbot, Glamorgan, July 29, 1907, H. J. RIDDELSDELL, as *Marshalli*, var. *semiglaber*.

185/130. R. DASYPHYLLUS Rogers. Bethesda, Carnarvon, G. C. DRUCE.

185/133. R. MARSHALLII Focke & Rogers, var. SEMIGLABER Rogers. Hope Mansell, Forest of Dean, Hereford, September 15, 1908, L. CUMMING.

185/137 b. R. ANGUSTIFRONS Sudre, var. PALLIDISETUS Sudre. Woods, Great Doward, Hereford, September 13, 1888, A. LEY, as *saxicolus* P.J.M.; Woods the Buckstane, W. Gloster, October 13, 1888, A. LEY, as *saxicolus* P.J.M.

*185/142 b. R. RIVULARIS P.J.M., var. SETIGER L. & M. Bladon, Oxon, G. C. DRUCE, as *hirtus* (see *Fl. Oxon*, ed. ii, p. 148). The second record for Britain. Delete var. *hirtifolius* from *Pl. List* and substitute *setiger* L. & M.

185/143. R. ACUTIFRONS Ley. Haugh Wood, Hereford, September 3, 1891, A. LEY.

185/145. R. TERETICAULIS Rogers (? of P.J.M.). Charlesworth, Derby, August 23, 1894, W. R. LINTON, as *foliosus* W. & N.; *Burnham, Bucks, G. C. DRUCE, as *Bellardi*; Boar's Hill, Berks, Dr A. H. EVANS and J. CHAPPLE. " It is probably the Boar's Hill Bramble given in *Fl. Berks*, p. 180, as *R. scaber*. The glaucous stem is a very striking feature of the growing plant and is unaccountably passed over in silence in the Handbook description. It is worth noting that at Mousehold Heath where it also occurs in Norfolk, it is accompanied by *Rubus hirtifolius*, as at Boar's Hill."—Wm. Watson, *in litt.*

*185/146. R. SPINULIFER M. & L. Greenham, Berks, 1895, G. C. DRUCE, det. as *Borreri* (N.C.R.) by W.M.R.; Enborne, Berks, G. C. DRUCE.

185/148 b. R. VELATUS Rogers non Lefv. Woods, Hope Mansell, Hereford, July 30, 1888, A. LEY.

185/149 j. R. DUMETORUM W. & N., var. TRIANGULARIS A. Ley. Southborne, August 29, 1908, L. CUMMING.

Var. k. RADULIFORMIS A. Ley. St Leonard's Forest, Sussex, July 22, 1898, J. W. WHITE, as *cognatus* N.E.Br.

†189/11. POTENTILLA NORVEGICA L. Waste ground near Settle, H. H. STURDY and J. N. FRANKLAND. New to the Craven part of v.-c. 64.

†189/17. P. INTERMEDIA L. Waste ground, Stoke-on-Trent, Staffs, D. LEWIS.

(The ALCHEMILLAS were kindly determined by Dr F. Jaquet.)

190/1. ALCHEMILLA HYBRIDA Mill. (A. PUBESCENS Lam.). Oxenber, Austwick and Outershaw, Upper Wharfedale, both in W. Yorks, v.-c. 64, W. A. SLEDGE.

190/4. A. MINOR Huds. Ingleborough, at 2100 ft., W. A. SLEDGE; also from Roudsea Wood, v.-c. 69b, W. A. SLEDGE.

*190/5. A. PASTORALIS Buser. Ingleborough, W. Yorks, v.-c. 64, at 2100 ft., W. A. SLEDGE.

*190/13. A. FIRMA Buser. Ingleborough, W. Yorks, v.-c. 64, at 2100 ft., W. A. SLEDGE.

(ROSES named by A. H. WOLLEY-DOD.)

194/12 j. R. AFZELIANA Fr., var. SUBCANINA Chr. Near Loch Tummel Hotel, E. Perthshire, J. E. LOUSLEY.

194/12 l. R. AFZELIANA Fr., var. DENTICULATA R. Kell. With small leaflets and fruits. Near Moulin, East Perthshire, J. E. LOUSLEY.

194/13 j. R. CORIIFOLIA Fr. (SUBCOLLINAE), var. SUBCORIIFOLIA (Barclay) W.-Dod. Near Loch Tummel Hotel, East Perthshire, J. E. LOUSLEY.

194/20. R. SHERARDI Davies, var. OMISSA (Déségl.) W.-Dod. Form with nearly smooth peduncles near Moulin, E. Perthshire, J. E. LOUSLEY.

194/21 b. R. VILLOSA L., var. MOLLIS Sm. Near Moulin, E. Perthshire, J. E. LOUSLEY.

ROSA NOTES FOR 1932, by E. B. Bishop. In order to give him more time to compile the new Sussex Flora, Colonel Wolley-Dod asked me to take over his work, for the time being, of naming Roses submitted to him. All sheets more than ordinarily doubtful and rarer forms have been submitted to Colonel Wolley-Dod himself.

All the records given below are N.C.R.s, in that they are new to Colonel Wolley-Dod's own lists. [The *Comital Flora* treats the Roses as aggregates and from that standpoint there is only one N.C.R. as indicated. The nomenclature is that of Colonel Wolley-Dod's Revision of the British Roses and the corresponding numbers of the *British Plant List,* 2nd edition, have been inserted for convenience of reference.—Ed.]

Collected by Miss E. S. TODD in July and August 1932:—
194/23. ×R. SABINI (Woods) W.-Dod. Westmorland, v.-c. 69.

194/6 h. R. CANINA L., var. SENTICOSA (Ach.) Baker. Bucks, v.-c. 24.

194/6 i. R. CANINA L., var. SENTICOSA (Ach.) Baker, f. OXYPHYLLA (Rip.) W.-Dod. Cumberland, v.-c. 70 ?.

194/6 m. R. CANINA L., var. RHYNCHOCARPA (Rip.) Rouy. Cumberland, v.-c. 70.

194/6 p. R. CANINA L., var. SPURIA (Pug.) W.-Dod., f. SYNTRICHOSTYLA (Rip.) Rouy. Cumberland, v.-c. 70.

194/7 d. ? R. CANINA L., var. MEDIOXIMA (Déségl.) Rouy. Cumberland, v.-c. 70.

194/7 g. R. CANINA L., var. BISERRATA (Mér.) Baker, f. ERIOSTYLA (Rip.) W.-Dod. Cumberland, v.-c. 70.

194/7 m. R. CANINA L., var. SYLVULARUM (Rip.) Rouy, with woolly styles. Cumberland, v.-c. 70.

194/8 e. R. CANINA L., var. VERTICILLACANTHA (Mér.) Baker, f. CLIVICOLA Rouy. Cumberland, v.-c. 70.

194/12 f. ? R. AFZELIANA Fr., var. GLAUCOPHYLLA (Winch) W.-Dod, f. MYRIODONTA Chr. Westmorland, v.-c. 69.

194/12 l. R. AFZELIANA Fr., var. DENTICULATA R. Kell. Cumberland, v.-c. 70.

194/13 f. R. CORIIFOLIA Fr., var. BAKERI (Déségl.) W.-Dod. Confirms a doubtful record. Cumberland, v.-c. 70.

194/13 l. R. CORIIFOLIA Fr., var. SUBCOLLINA Chr. Cumberland, v.-c. 70.
As regards the queries, *oxyphylla* was probably (but not certainly) found in v.-c. 70, whilst in the other two cases the specimens are too far off type to be recorded without a ? in each case.

An examination of Devon Roses in Herb. Hiern, selected and submitted by Mr G. B. SAVERY, yielded the following N.C.R.s:—

V.-c. 3.
194/5 f. R. STYLOSA Desv., var. ELLIPTICIFOLIA Rouy. Confirms a doubtful record.

194/8 e. R. CANINA L., var. VERTICILLACANTHA (Mér.) Baker, f. CLIVICOLA Rouy.

V.-c. 4.

194/2. ×R. BIBRACTEOIDES W.-Dod.

*194/5 l. R. STYLOSA Desv., var. PSEUDO-RUSTICANA Crép.

194/23. ×R. SABINI (Woods) W.-Dod.

194/6 a. R. CANINA L., var. LUTETIANA (Lem.) Baker, f. LASIOSTYLIS Borb.

194/6 g. R. CANINA L., var. FLEXIBILIS (Déségl.) Rouy.

194/6 p. R. CANINA L., var. SPURIA (Pug.) W.-Dod, f. SYNTRICHOSTYLA (Rip.) Rouy.

194/6 n. R. CANINA L., var. GLOBULARIS (Franch.) Dum.

194/7. R. CANINA L., var. DUMALIS (Bechst.) Dum.

194/7 h. R. CANINA L., var. DUMALIS (Bechst.) Dum., f. VIRIDICATA (Pug.) Rouy.

194/7 h. R. CANINA L., var. DUMALIS (Bechst.) Dum., f. CLADOLEIA (Rip.).

194/7 i. R. CANINA L., var. CARIOTI (Chab.) Rouy.

194/7 k. R. CANINA L., var. FRAXINOIDES H. Br.

194/7 m. R. CANINA L., var. SYLVULARUM (Rip.) Rouy.

194/8 e. R. CANINA L., var. VERTICILLANTHA (Mér.) Baker.

194/10 b. R. DUMETORUM Thuill., var. TYPICA W.-Dod, f. URBICA (Lem.) W.-Dod.

194/10 f. ? R. DUMETORUM Thuill., var. GABRIELIS (F. Gér.) R. Kell.

194/10 g. R. DUMETORUM Thuill., var. CALOPHYLLA Rouy.

194/10 h. ? R. DUMETORUM Thuill., var. PLATYPHYLLA (Rau) W.-Dod.

194/10 m. R. DUMETORUM Thuill., var. HEMITRICHA (Rip.) W.-Dod.

194/18 g. R. OBTUSIFOLIA Desv., var. SCLEROPHYLLA (Scheutz) W.-Dod.

Gabrielis and *platyphylla* are too untypical to be recorded without a ? in each case.

A parcel of Roses from Mr P. G. BEAK, collected within three miles of Bampton, Oxon (excellent alike in quality and quantity of material, and in careful drying and setting out), yielded the following N.C.R.s for v.-c. 23: —

194/6 a. R. CANINA L., var. LUTETIANA (Lem.) Baker, f. LASIOSTYLIS Borb.

194/6 p. R. CANINA L., var. SPURIA (Pug.) W.-Dod, f. SYNTRICHOSTYLA (Rip.) Rouy.

194/11 c. R. DUMETORUM Thuill., var. INCERTA (Déségl.) W.-Dod, f. LAEVISTYLA W.-Dod.

194/19 a. R. TOMENTOSA Sm., var. TYPICA W.-Dod. Confirms a doubtful record.

194/8 j. A very interesting Rose, collected by Mr W. BIDDISCOMBE, near Horsell, Surrey, in 1932, has been diagnosed by Col. Wolley-Dod as *R. canina* L., var. *Pouzini* (Tratt.) W.-Dod, f. *anglica* Dingl., but with hispid styles. Col. Wolley-Dod adds, "It must go under *Pouzini*, and best as *anglica*, though the resemblance (*i.e.*, at first sight, and apart from its strong biserration) is much nearer *Wolley-Dodii* Sudre."

This is a new county record for v.-c. 17, and but the third v.-c. for f. *anglica*, the others being 16 and 33.

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†196/3. CRATAEGUS PUNCTATA Jacq. Lewes, E. Sussex, Miss K. PICKARD.

216/1. MYRIOPHYLLUM SPICATUM L. Basingstoke Canal near Odiham, N. Hants, P. M. HALL.

216/2. M. ALTERNIFLORUM DC. Pond, Hankley Common, Surrey, J. G. LAWN.

*217/2. CALLITRICHE OBTUSANGULA Le Gall. Ditches at Loch Shiel, v.-c. 97 (not 98), G. TAYLOR.

*217/3. C. VERNALIS Koch. Fleet, N. Hants, Lt.-Col. G. WATTS.

220/5. EPILOBIUM TETRAGONUM L. Guildford chalk-quarry, and roadside near Birtley Farm, Witley, Surrey, G. M. ASH.

220/7. E. OBSCURUM Schreb. Near Brook, Godalming, and in an arable field near Birtley Farm, Witley, Surrey, G. M. ASH.

†220/15. E. NUMMULARIFOLIUM R.C. Bettws-y-Coed, Carnarvon, Dr F. W. STANSFIELD.

243/1. CONIUM MACULATUM L. Waste ground, Ipswich, E. Suffolk, Rt. Hon. H. T. BAKER and Hon. Mrs JASPER RIDLEY.

*246/1. Trinia glauca Dum. Rowde, N. Wilts, Miss P. Leake.

255/1. Pimpinella magna L. Hedgerow near Shenley, Herts, Rev. E. C. Cruttwell.

†276/3. Peucedanum sativum (L.) B. & H. Between Gisburn and Sawley, N.W. Yorks, H. H. Sturdy and J. N. Frankland. New to the Craven part of v.-c. 64.

†*278/1. Tordylium maximum L. Worthing, W. Sussex, Miss P. M. Pearsall. A new record for Sussex county.

†287/1. Sambucus racemosa L. Milford Common, Surrey, G. M. Ash.

287/2 c. S. nigra L., var. rotundifolia DC. Milford Common, Surrey, G. M. Ash.

*296/3. Galium erectum Huds. Luxuriant on railway bank, Llanishen, Glamorgan, v.-c. 41, Miss E. Vachell.

298/3. Asperula cynanchica L. Roundway, N. Wilts, Miss P. Leake.

306/2. Dipsacus pilosus L. Potterne Woods, N. Wilts, Miss P. Leake.

†320/3. Erigeron canadensis L. *Near Rowde, N. Wilts, Miss P. Leake; waste ground, near railway, Ipswich, E. Suffolk, Rt. Hon. H. T. Baker and Hon. Mrs Jasper Ridley.

†327/1. Antennaria margaritacea R. Br. Brynmawr, Monmouth, Miss P. Leake.

328/3. Gnaphalium sylvaticum L. Railway bridge, Gerards Cross, Bucks, Mrs Pemberton Pigott.

†333/1. Inula Helenium L. Fields near Ningwood, Isle of Wight, Rev. E. C. Cruttwell.

†335/1. Buphthalmum speciosum (Schreb.) Dr. (Telekia). Woodwalton Fen, Hunts, H. Phillips.

†341/3. Xanthium spinosum L. In a cucumber frame, Colwall, Herefordshire, growing very vigorously, F. M. Day.

†351/1. Guizotia abyssinica Cass. Waste ground, Welwyn, Herts, H. Phillips. Sp. non vidi.

†354/1. Galinsoga parviflora Cav. Abundant on Greensand at Galley Hill, Sutton, Beds, in a field of runner beans, J. E. Little; Wimbledon Common, Surrey, Mrs W. E. Gray.

†370/17. CHRYSANTHEMUM CORONARIUM L. Waste heap, Welwyn, Herts, H. PHILLIPS.

371/1. MATRICARIA INODORA L. Blackmoor, Liss, N. Hants, W. J. L. PALMER.

378/1. ARTEMISIA ABSINTHIUM L. Waste heap, Welwyn, Herts, H. PHILLIPS.

*380/3. PETASITES FRAGRANS Presl. Bassett Down, N. Wilts, v.-c. 7, G. D. GROSE.

383/6 b. SENECIO ERUCIFOLIUS L., var. DISCOIDEUS Dr. Northleigh Common, Oxon, J. CHAPPLE, Sir R. CURTIS, and T. W. SOUTHRON.

383/7. S. SQUALIDUS L. Near railway between Birmingham and Wolverhampton, Staffs, R. C. L. BURGES.

383/10 c. S. VULGARIS L., var. ERECTUS (Trow). Field near Hitchin, Herts, H. PHILLIPS. Sp. non vidi.

383/32. S. INTEGRIFOLIUS Clairv. (CAMPESTRIS DC.). Rowde, N. Wilts, Miss P. LEAKE.

396/1. CIRSIUM ERIOPHORUM L. Rowde, N. Wilts, Miss P. LEAKE.

396/2. C. LANCEOLATUM Scop. Gravel pit, Letchworth, Herts, H. PHILLIPS.

410/1. ARNOSERIS MINIMA Schw. & Krtc. Pitland's Farm, Thursley, Surrey, J. G. LAWN.

416/3. CREPIS BIENNIS L. Rowde, N. Wilts, Miss P. LEAKE; Matfield, W. Kent, W. H. PEARSALL.

416/10. C. TARAXACIFOLIA Thuill. Waste ground, Hitchin, Herts, H. PHILLIPS.

422/2. LEONTODON AUTUMNALIS L., cf. f. RUNCINATUS Boreju. Waste heap, Hitchin, Herts, H. PHILLIPS.

(The TARAXACA have been kindly determined by Dr H. Dahlstedt.)

423/1. TARAXACUM BRACHYGLOSSUM Dahlst. The Leys, Glamorgan, 1930, Miss E. VACHELL.

423/2. T. DECIPIENS Raunk. Modification, Fleam Dyke, Cambs, H. PHILLIPS.

423/5(2). T. GLAUCINIFORME Dahlst. Leigh Woods, Clifton, Bristol, N. Somerset, Mrs SANDWITH.

423/6. T. LACISTOPHYLLUM Dahlst. Hitchin, Herts; Fleam Dyke, Cambs, H. PHILLIPS; a modification, Rievaulx Abbey, N.E. Yorks, 1931, Miss E. VACHELL.

423/7. T. LAETUM Dahlst. Modification, Dawlish, S. Devon, 1912, C. WATERFALL.

423/23. T. FAEROENSE Dahlst. Marshy places by sub-alpine rills, Corrie Sharoch, Glen Clova, Angus, 1931, Miss E. VACHELL; Blackdown, W. Sussex, 1927, R. J. BURDON (see *Rep. B.E.C.*, 578, 1927).

423/26. T. MACULIGERUM Lindb. f. A form belonging to this from Lavernock, Glamorgan, Miss E. VACHELL.

423/29. T. NORDSTEDTII Dahlst. Upper Teesdale, Durham, 1931, Miss E. VACHELL.

423/46(2). T. CAPHNOCENTRUM Dahlst. Modification, Mile End, Lambourn, Berks, 1931, G. C. DRUCE.

423/75(3). T. OBSCURATUM Dahlst. Hitchin, Herts, H. PHILLIPS.

423/78(2). T. PERHAMATUM Dahlst. Hitchin, Herts, H. PHILLIPS.

423/84(2). T. STENACRUM Dahlst. Wilbury Hill, Herts, H. PHILLIPS; modification, Roade, Northants, 1931, G. C. DRUCE.

423/84(5). T. SUBEXPALLIDUM Dahlst. A form belonging to this from Roade, Northants, 1931, G. C. DRUCE.

423/88(2). T. SUBPALLESCENS Dahlst. Modification. Hitchin, Herts, H. PHILLIPS.

425/2 b. LACTUCA SCARIOLA L., var. INTEGRATA Gren. & Godr. Waste ground, near railway, Ipswich, E. Suffolk, Rt. Hon. H. T. BAKER and Hon. Mrs JASPER RIDLEY.

*†425/6. MULGEDIUM ALPINUM Less. Cindery footpath, Chester, C. WATERFALL. Det. Kew. Surely this must be a garden escape?

427/3 g. SONCHUS ASPER Hill, var. LEPTOPHYLLUS Dr., ined. Didcot, Berks, G. C. DRUCE

427/4 d. S. OLERACEUS L., var. TRIANGULARIS Wallr. Waste heap, Welwyn, Herts, H. PHILLIPS.

435/3. CAMPANULA TRACHELIUM L. Wood near Shackleford, Surrey, G. M. ASH.

*435/4. C. RAPUNCULOIDES L. Newhaven, E. Sussex, LEWIS A. W. BURDER.

446/1 b. ERICA CINEREA L., var. SCHIZOPETALA Boulg. One plant, on the golf course, at Crowborough, E. Sussex, E. D. MORGAN.

458/4. STATICE MARITIMA Mill. Snowdon, Carnarvon, R. C. L. BURGES.

478/1 b. CENTAURIUM UMBELLATUM Gilib., var. CAPITATA Koch, f. SUBCAPITATA Wittr. Sand-dunes, Braunton, N. Devon, G. C. DRUCE. " . . . seems to me indistinguishable from, or, at least, to grade into var. CONFERTA Wh. & S."—E. DRABBLE, *in litt.*

478/1 d. C. UMBELLATUM Gilib., var. CONFERTUM (Wh. & S.). Down at Lulworth Cove, Dorset, H. PHILLIPS. Sp. non vidi.

478/5. C. TENUIFLORUM (H. & L.) Fritsch. Isle of Wight, vide sp., Dr E. DRABBLE and J. W. LONG.

480/1. GENTIANA PNEUMONANTHE L. Near Jarvis Brook, Ashdown Forest, E. Sussex. Still in bloom and showing plenty of unopened flower-buds on 6th October 1932, E. D. MORGAN.

506/4. MYOSOTIS CESPITOSA K. F. Schultz. Dwarf (6 ins. high) and simple stemmed form, sea-shingle, the Crumbles, Eastbourne, E. Sussex, L. A. W. BURDER, det. WADE.

†513/3. CONVOLVULUS TRICOLOR L. By the Medina, Newport, I. of Wight, J. W. LONG.

515/4. CUSCUTA TRIFOLII Bab. Railway-bank, Gerard's Cross, Bucks, Mrs PEMBERTON PIGOTT.

521/1. ATROPA BELLADONNA L. Stanway, N. Essex, Miss M. S. CAMPBELL.

†532/2. LINARIA PURPUREA Mill. Waste ground at Settle, H. H. STURDY and J. N. FRANKLAND. New to Craven district.

*532/7. L. MINOR (L.) Desf. On the railway-track of the Colne-Skipton branch, S. Lancs, A. TURNER.

†535/6. SCROPHULARIA PEREGRINA L. Lewes, E. Sussex, Miss K. PICKARD.

539/1. LIMOSELLA AQUATICA L. In abundance on stretch of mud by the little reservoir, near Tring, Herts, Rev. E. C. CRUTTWELL.

543/20. VERONICA POLITA Fries. Hogsback, Surrey, G. M. ASH.

546/1. BARTSIA ALPINA L. Near Tebay, Westmorland, v.-c. 69a, where it has been known for about 250 years. In beautiful flower and in great abundance, July 1932, A. WILSON.

549/3 e. Melampyrum pratense L., var. montanum (Johnston). Burton-on-Trent, Staffs, R. C. L. Burges.

550/7. Orobanche Hederae Duby. Observatory Hill, Clifton, W. Gloster, Miss E. Vachell.

*550/10. O. minor Sm. Silloth, Cumberland, Miss Parkin.

*553/2. Pinguicula vulgaris L. Ashdown Forest, E. Sussex, Miss E. M. Harding and members of the Tunbridge Wells Nat. Hist. Society. A notable discovery.

*†558/2=558/3×. Mentha longifolia Huds. × rotundifolia Huds. [= × Mentha niliaca Jacq., var. alopecuroides (Hull) Briquet; and = 1538 Mentha alopecuroides Hull of "The London Catalogue of British Plants," Eleventh Edition (1925)] (*fide* John Fraser, who saw my seven specimens of Ref. No. 4593 on 16th December 1932).—Ref. No. 4593, grassy ground at outer side of a stone wall round a farm stack-yard, near a dwelling-house, 10 feet above mean sea-level, South Via, Papa Westray, Orkney, 31st August 1932, H. H. Johnston. Not native. Common. Plants in flower-bud and sparingly in flower. Fresh leaves and flowers with the aromatic odour of Mint. Corolla purple. Mr William Traill, of Holland, Papa Westray, informed me of the station for this non-native hybrid Mint, which is a new record for this hybrid for v.-c. 111.

†558/3×e. M. longifolia Huds. × rotundifolia Huds. [= × Mentha niliaca Jacq., var. Druceana Fraser] (*fide* John Fraser, who saw James Sinclair's one specimen of his Ref. No. 768, and my two specimens of my Ref. No. 4568, on 16th December 1932).—James Sinclair's Ref. No. 768 and my Ref. No. 4568, grassy bank at roadside, near a dwelling-house, 15 feet above mean sea-level, "Inkbottle House," Wing, South Walls, Hoy, Orkney, 16th August 1932, James Sinclair and H. H. Johnston. Not native. Very rare. Plants in flower-bud and sparingly in flower. Fresh leaves and flowers with the aromatic odour of Mint. Corolla light purple. A new record for this non-native hybrid Mint for v.-c. 111, discovered by James Sinclair, junior, on 13th August 1932.

560/1 d. Origanum vulgare L., var. virescens Car. et St Lag. (=var. virens Gr. et Godr.), teste Drabble. Downs near West Clandon, Surrey, C. E. C. H. Burton.

565/1. Melissa officinalis L. Barham, E. Kent, Miss L. Abell.

569/1. Nepeta Cataria L. Worthing, W. Sussex, Miss P. M. Pearsall; Rowde, N. Wilts, Miss P. Leake.

573/1. Prunella vulgaris L. (white flowers). Roundway, N. Wilts, Miss P. Leake.

*573/2. P. LACINIATA L. Field near Chalfont St Peter, Bucks, Mrs Pemberton Pigott.

576/1. Marrubium vulgare L. Above Scratchell's Bay, the Needles, I. of Wight, Rev. E. C. Cruttwell.

577/4. ×Stachys ambigua Sm. Near Cardiff, Glamorgan, Miss P. Leake.

577/6. S. arvensis L. Philleigh, E. Cornwall, J. D. Grose; Salt Hill, Bucks, Mrs Pemberton Pigott.

578/2 b. Galeopsis Tetrahit L., var. bifida (Boenn.) Lej. & Court. Ruan High Lanes, E. Cornwall, J. D. Grose.

581/3. Lamium purpureum L., var. albiflorum. Baldock, Herts, H. Phillips.

581/6. L. amplexicaule L. Sandridge, N. Wilts, Miss P. Leake.

583/1. Ballota nigra L. Rowde, N. Wilts, Miss P. Leake.
Var. c. borealis (Schweig.). Foxcote, E. Gloster, Miss L. Abell.

†588/1. Plantago indica L. (P. ramosa Asch.; P. arenaria Waldst. et Kit.) (*fide* A. R. Horwood).—Ref. N. 771, shell-sandy, stony seashore, 7 ft. above mean sea-level, below the Church of Scotland Manse, Glebe, Bay of Creekland, Hoy, Orkney, 23rd August 1932, James Sinclair. Not native. Very rare. One small clump of plants. A new record for this alien species for v.-c. 111, discovered by James Sinclair, junior, on 23rd August 1932. Waste ground near Stoke-on-Trent, Staffs, D. Lewis. A very large and robust plant, fifteen inches high; not mentioned in Boydon-Ridge's *Fl. of N. Staffs.*

588/8 d. P. lanceolata L., var. elliptica Dr., teste Drabble. Frinton, N. Essex, H. Phillips.
Var. b. Timbali auct. angl. (? Jord.), det. Drabble. Gravel-pit, Letchworth, Herts, H. Phillips.

†596/6. Amarantus retroflexus L. Waste ground, Welwyn, Herts, H. Phillips. Sp. non vidi.

†596/11. A. angustifolius Lam. (Blitum L., p.p.). Waste ground. Welwyn, Herts, H. Phillips. Sp. non vidi.

600/3. Chenopodium Bonus-Henricus L. Foxcote, E. Gloster, Miss L. Abell.

600/4. C. hybridum L. Waste heap, Welwyn, and Hertford College, Herts, H. Phillips.

600/8. C. ALBUM × HIRCINUM. Parks Road, Oxford, 1931, Lady DOUIE. " . . . very rare, and often incorrectly determined. The structure of the surface of the seeds is intermediate. Evil-scented. A most interesting find."—P. AELLEN, *in litt.*

600/12. C. FICIFOLIUM Sm. Welwyn, Herts, H. PHILLIPS.

600/15. C. POLYSPERMUM L. Waste heap, Welwyn, Herts, H. PHILLIPS.

611/5. SALICORNIA RAMOSISSIMA Woods. Portishead, N. Somerset; Skegness, N. Lincs, Mrs MACALISTER HALL, det. DRABBLE.

611/7. S. GRACILLIMA (Woods) Moss. Pagham, S. Hants, A. J. WILMOTT and P. M. HALL. Prof. E. J. Salisbury agrees to the name.

615/2 b. POLYGONUM CONVOLVULUS L., var. SUBALATUM Lej. & Court. Brixham, Preston-on-Teign and Kingsteignton, S. Devon, v.-c. 3, F. M. DAY.

615/3. P. BISTORTA L. From a large patch, about 8 ft. across, producing few flowers, by the Thames near Culham, Oxon, August 22, 1932, P. G. BEAK. Dr Druce's *Fl. of Oxfordshire*, ed. 2, p. 360, says: " Very rare and perhaps the relic of ancient culture." I can find no previous references to this locality.

615/15. P. AEQUALE Lindm. Benson, Oxon, 1931, G. C. DRUCE.

*618/2. RUMEX LONGIFOLIUS DC. (DOMESTICUS Hartm.). Burton-on-Trent, Staffs, 1930, G. C. DRUCE.

618/3 f. R. CRISPUS L., var. SUBCORDATUS Warren. Rowde, N. Wilts, Miss P. LEAKE.

×OBTUSIFOLIUS = × R. ACUTUS L. Grangemouth, Stirling, 1930; Pixey's Mead, Oxon, 1931; Cluny, E. Perth, 1931; probably this from near Avebury, N. Wilts, 1931 (" vel forsan *longifolius* × *obtusifolius* "); Ascott-under-Wychwood, Oxon, 1931, G. C. DRUCE.

618/6 b. R. OBTUSIFOLIUS L., var. AGRESTIS Danser as sub-sp. Godstow, Oxon; Slapton, S. Devon, 1931, G. C. DRUCE.

618/9. R. CONGLOMERATUS × PULCHER = × R. MURETI Haussk. Waste ground, Welwyn, Herts, H. PHILLIPS. Sp. non vidi. Dr Danser queries a plant from Avebury, N. Wilts, 1931, G. C. DRUCE, as this hybrid.

618/11. R. PULCHER L. Ivinghoe, Bucks, H. PHILLIPS.

†618/19. R. SALICIFOLIUS Weinm. Newport, Isle of Wight, J. W. LONG.

†618/20. R. Patientia L. Waste ground, West Dock, Hull, S.E. Yorks, C. Waterfall.

*622/1. Aristolochia Clematitis L. Mayfield, E. Sussex, Miss K. M. Simpson. Removes the ? from v.-c. 14 in the *Comit. Fl.*

623/2. Daphne Mezereum L. Shrewley, Warwickshire. First recorded from this station by Bagnall (*Fl. Warw.*), 1866. Still there in 1933, R. C. L. Burges.

627/1. Thesium humifusum DC. Chalk downs, Roundway, N. Wilts, Miss P. Leake; Northleach, E. Gloster, Rt. Hon. H. T. Baker.

628/9. Euphorbia virgata W. & K. By the Lane from Gerards Cross to Rickmansworth, Herts, Mrs Pemberton Pigott. Sp. non vidi.

628/14. E. Peplus L. Waste ground, Ipswich, E. Suffolk, Rt. Hon. H. T. Baker and Hon. Mrs Jasper Ridley.

633/1. Ulmus glabra Hudson, var. montana Lindquist in *Rep. B.E.C.*, 785, 1931. *Melsetter, Hoy, Orkney, August 1931, G. C. Druce (see *Rep. B.E.C.*, 667, 1931, where this is recorded as *U. montana* Stokes); Inchnadamph, W. Sutherland, 1907, G. C. Druce, teste Lindquist.

650/1. Salix pentandra L. Roadside near Tiltham's Green, Godalming, Surrey, G. M. Ash.

650/4. S. triandra L. Roadside near Linstead Farm, Godalming, Surrey, G. M. Ash.
× viminalis = undulata Ehrh. Bampton, Oxon, 1932, P. G. Beak.

650/17 b. S. Myrsinites L., var. procumbens (Forbes). Ben Laoigh, Argyll, Mrs Macalister Hall. Det. Fraser, who says it is an uncommon form.

664/2. Spiranthes spiralis C. Koch. Two places at Staplehurst, W. Kent, H. D. Stanley! Also at Matfield, W. Kent, Miss K. M. Simpson! All these are new stations for the county. Above Scratchell's Bay, The Needles, I. of Wight, Rev. E. C. Cruttwell.

665/1. Goodyera repens L. Stuston Common, near Diss, E. Noffolw, L. Green. see Rep for 1933, 542 & Sup.

668/3. Helleborine leptochila (Godfery). Lambridge Wood, Henley, Oxon, J. Chapple, det. P. M. Hall.

669/5. Orchis Morio L. With pale-pink flowers, Rowde, N. Wilts, Miss P. Leake.

*669/8 b. O. PRAETERMISSA Dr., var. PULCHELLA Dr. Finlay's Park, Killean, Cantyre, Argyll, Mrs MACALISTER HALL, teste P. M. HALL.

669/10 b. O. MACULATA L., var. LEUCANTHA Dr. Upper Wharfedale, W. Yorks, H. H. STURDY and J. N. FRANKLAND.

669/10. O. MACULATA × PRAETERMISSA = × O. HALLII Dr. Killean, Cantyre, Argyll, Mrs MACALISTER HALL, teste P. M. HALL.

669/11. O. FUCHSII Dr. Killean, Cantyre, Argyll, Mrs MACALISTER HALL.

Var. ALBIFLORA Dr. Tangy, Cantyre, Argyll, Mrs MACALISTER HALL, teste P. M. HALL.

672/3. OPHRYS APIFERA Huds. Roundway, N. Wilts, Miss P. LEAKE.

*†680/1. SISYRINCHIUM ANGUSTIFOLIUM Mill. Waste heap, Welwyn, Herts, H. PHILLIPS.

718/8. JUNCUS SUBNODULOSUS Schrank. Mitcham Common, Surrey, A. L. STILL.

718/16. J. MACER S. F. Gray. (J. TENUIS Willd.). Hankley Common, Surrey, J. G. LAWN; Hassocks, Sussex, L. A. W. BURDER.

719/6. LUZULA CAMPESTRIS (L.) DC. Rowde, N. Wilts, Miss P. LEAKE.

729/1 b. ALISMA PLANTAGO-AQUATICA L., var. LANCEOLATUM (With.). Very common in v.-c. 64. Often recorded as the type, H. H. STURDY and J. N. FRANKLAND.

730/1. ECHINODORUS RANUNCULOIDES (L.) Engelm. A very narrow-leaved form from Wicken Fen, Cambs, H. PHILLIPS.

731/1. ELISMA NATANS L. Canal, Adlington, Cheshire, J. W. HARTLEY.

(POTAMOGETON, teste W. H. PEARSALL.)

737/2 b. P. POLYGONIFOLIUS Pourr., var. AMPHIBIUS Fries, f. PARVIFOLIUS Pearsall. Craigower, near Pitlochry, East Perth, J. E. LOUSLEY.

737/3. ×P. DRUCEI Fryer. Still in the Loddon, Berks, but a lengthy and careful search failed to reveal any ripe fruits, and only one patch was found with flowering spikes, J. E. LOUSLEY.

737/5. P. ALPINUS Balb. Ditch south of Old Byfleet Church, Surrey; Loch Clunie, East Perth (deep water lake form), J. E. LOUSLEY.

737/9 f. P. GRAMINEUS L., var. LACUSTRIS Fr. Loch Clunie, East Perth, J. E. LOUSLEY.

737/16 c. P. PERFOLIATUS L., var. OVATIFOLIUS Wallr. Amberley Wild Brooks, West Sussex; R. Loddon near Whistley Mill, Berks, J. E. LOUSLEY.

737/17 d. P. CRISPUS L., var. OBTUSIFOLIUS Fieber. Cliffe, West Kent, J. E. LOUSLEY.

737/17. ×P. BENNETTII Fryer (P. CRISPUS × PUSILLUS) ex Hagström. Albury, Surrey, J. E. LOUSLEY. New English station. Previously recorded from Shere, Surrey, 1912, C. E. SALMON.

*737/29 c. P. PECTINATUS L., var. UNGULATUS Hagstr. River Loddon, below Loddon Bridge, Berks, J. E. LOUSLEY.

737/5 d. P. ALPINUS Balb., var. PALMERI Druce. Basingstoke Canal, near Odiham, N. Hants, P. M. HALL. Fine fruiting examples seen later *in situ* by P. M. HALL, W. D. MILLER, and W. H. PEARSALL.

737/22. P. FRIESII Rupr. Basingstoke Canal, near Odiham, N. Hants, P. M. HALL.

737/25. P. PANORMITANUS Biv.-Bern. Fleet Pond, N. Hants, P. M. HALL; *Esthwaite Water, N. Lancs, Miss E. VACHELL; Windermere Lake, N. Lancs, in fine fruiting condition, Dr W. H. PEARSALL.

*737/27. P. TRICHOIDES Cham. et Schlecht. Fleet Pond, N. Hants, P. M. HALL.

737/30. P. FILIFORMIS Pers. Rescobie Loch, Angus, Mrs MACALISTER HALL.

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*740/2. ZOSTERA NANA Roth. West Mersea Island, Essex, v.-c. 19, Miss MAYBUD CAMPBELL. Vidi siccam spontaneam.

747/2. ERIOPHORUM ANGUSTIFOLIUM Roth. Salcombe, S. Devon, J. D. GROSE.

749/1. SCHOENUS NIGRICANS L. Stony bog on Craigower at 1100 ft. near Pitlochry, East Perth, J. E. LOUSLEY.

*753/16. CAREX FRIGIDA Syme non All. (C. SADLERI Linton). With *C. binervis*, var. *nigrescens* Druce at about 2700 ft. on the Cairnwell, on the county boundary dividing Aberdeen and Perth, and most probably in v.-c. 92 as well as 89, J. E. LOUSLEY.

753/20. C. FLAVA L. Redland Wood, Dorking, Surrey, J. G. LAWN.

753/21. C. LEPIDOCARPA Tausch. Foxcote, E. Gloster, Miss L. ABELL.

753/32 b. C. PILULIFERA L., var. LONGIBRACTEATA Lange, det. BUTCHER. Railway bank, Gerard's Cross, Bucks, Mrs PEMBERTON PIGOTT.

753/61. C. PAIRAEI F. Schultz. Charterhouse Copse, Surrey, G. M. ASH.

(The following CARICES have been kindly determined by Dr GEORG KÜKENTHAL.)

*753/3. CAREX ACUTIFORMIS Ehrh., forma PENDENS Kükenthal. Spiculis ♀ longe pedunculatis sub pendatis. Roudsea Wood, Haverthwaite, v.-c. 69, 1932, W. A. SLEDGE.

753/7. C. INFLATA × VESICARIA = C. PANNEWITZIANA Fig. Austwick Moss, Mid-West Yorks, 1932, W. A. SLEDGE.

753/9. C. HIRTA L., forma MAJOR Peterm. Montrose Basin, Angus, 1932, R. H. CORSTORPHINE.

753/15 b. C. BINERVIS L., var. ALPINA Drej. Head of Glen Phee; Winter Corrie, Clova, Angus, 1931, R. H. CORSTORPHINE, with type *binervis*.

753/20 d. C. FLAVA L., var. PYGMAEA Anders. Corrie Sharoch, Clova, Angus, 1916, R. H. CORSTORPHINE.

×FULVA (HOSTIANA DC.) = XANTHOCARPA Dégl. West Corrie, Fialzioch, 1916; Dounalt, 1915, Clova, Angus, R. H. CORSTORPHINE.

753/45 c. C. ELATA All., var. HOMALOCARPA (Peterm.) Reichb. Askham Bog, Mid-West Yorks, 1931, W. A. SLEDGE.

×GOODENOWII. A plant from Lawkland Moss, Mid-West Yorks, 1928, W. A. SLEDGE. Dr KÜKENTHAL thinks it is this hybrid.

753/46 h. C. GRACILIS Curt., var. STRICTIFOLIA (Opiz) Anders. Shores of Adel Dam, Mid-West Yorks, 1932, W. A. SLEDGE.

Var. j. TRICOSTATA (Fr.) Aschers. Cawthorne, S. W. Yorks, W. A. SLEDGE.

753/47. C. AQUATILIS Wahl. S. Esk near Netherton, 1914; Fialzioch, 1916; Inchdowrie, Clova, Angus, 1931, R. H. CORSTORPHINE; Bridge of Dun, Angus, 1926, Dr CAMPBELL.

Var. e. SPHAGNOPHILA Fries. Glen Fialzioch, Clova, Angus, 1916, R. H. CORSTORPHINE.

753/49 b. C. GOODENOWII Gay, var. CHLOROSTACHYA (Reichb.) Asch. Strath Swardal, near Broadford, Skye, 1930, W. A. SLEDGE.

Var. c. FULIGINOSA (A. Br.). Mansugh Bog, v.-c. 69, W. A. SLEDGE.

Var. e. JUNCEA (Fr.) Asch. Lawkland Moss, Mid-West Yorks, 1932, W. A. SLEDGE.

Var. h. RECTA Fleischer. Glen Phee, Angus, 1914, R. H. CORSTORPHINE; [Ref. Z.76], Send, Surrey, 1922, J. E. LOUSLEY; Lawkland Moss, Mid-West Yorks, 1928; Ainsdale Slacks, S. Lancs, 1927; Strath Swardal, near Sligachan, Skye, 1930, W. A. SLEDGE.

Var. i. STENOCARPA Kükenthal. Loch Cill Chriosd, near Broadford, Skye, 1930, W. A. SLEDGE; Caenlochan, Clova, Angus, 1916, R. H. CORSTORPHINE.

Var. j. STRICTIFORMIS Bailey. Lawkland Moss, Mid-West Yorks, 1932, W. A. SLEDGE.

× RIGIDA Kükenthal. Winter Corrie, Clova, Angus, 1916, R. H. CORSTORPHINE.

753/53. C. LEPORINA L., forma ROBUSTIOR Fick. Lake, Guynd, Angus, 1924, R. H. CORSTORPHINE.

753/58 c. C. CANESCENS L., var. ROBUSTIOR Blytt. Lochnagar, S. Aberdeen, 1926, W. A. SLEDGE.

*753/63. C. PANICULATA × REMOTA = C. BOENNINGHAUSIANA Weihe. Roudsea Wood, Haverthwaite, v.-c. 69, W. A. SLEDGE.

753/66. C. DISTICHA Huds. (INTERMEDIA Good.). Rescobie, Angus, 1924, R. H. CORSTORPHINE.

753/67. C. ARENARIA L. Stuston Common, Diss, E. Norfolk, L. GREEN. A new inland locality for v.-c. 27.

753/68. C. DIVISA Huds. Mitcham Common, Surrey, A. L. STILL.

†754/1. PANICUM MILIACEUM L. Waste heap, Hitchin, Herts, H. PHILLIPS; Medina Estuary, Newport, I. of Wight, J. W. LONG; Lewes, Sussex, L. A. W. BURDER.

†754/8. P. CRUS-GALLI L. Waste ground, Letchworth, Herts, H. PHILLIPS. Sp. non vidi.

†756/1. SETARIA ITALICA (L.) Beauv. Medina Estuary, I. of Wight, J. W. LONG.

†756/2 b. S. VIRIDIS (L.) Beauv., var. MAJUS (Gaud.) Koch. Waste heap, Hitchin, Herts, H. PHILLIPS.

†756/4. S. VERTICILLATA (L.) Beauv. Gerard's Cross, Bucks, Mrs PEMBERTON PIGOTT.

†765/5. PHALARIS CANARIENSIS L. Near Henley, Oxon, J. CHAPPLE.

780/4. AGROSTIS SETACEA Curt. Bovey Tracey, S. Devon, C. WATERFALL.

783/2. CALAMAGROSTIS LANCEOLATA Roth. Near Elstead, Godalming, Surrey, G. M. ASH.

794/3. AVENA PRATENSIS L. Hog's Back, Surrey, G. M. ASH.

808/1. CYNOSURUS ECHINATUS L. Gerards Cross Common, Bucks, Mrs PEMBERTON PIGOTT; *Shoreham, W. Sussex, L. A. W. BURDER.

*818/1. MELICA NUTANS L. Morlais Castle Hill, near Merthyr, Glamorgan, Miss E. VACHELL and A. E. WADE. Previous records of *M. nutans* L. for Glamorgan refer to *M. uniflora* Retz. = *M. nutans* Huds. non L.

818/2. M. UNIFLORA Retz., forma ALBA. Matfield, W. Kent, W. H. PEARSALL; Crowborough, E. Sussex, E. D. MORGAN.

820/1. CATAPODIUM LOLIACEUM Link. (POA LOLIACEA Huds., FESTUCA ROTBOELLIOIDES Kunth, DESMAZERIA LOLIACEA (Huds.) Nyman) (*fide* C. E. Hubbard, who saw James Sinclair's five specimens of his Ref. No. 758 at the Royal Herbarium, Kew, on 11th August 1932).—Ref. No. 758, shell-sandy, grassy seashore, 10 feet above mean sea-level, Breckness, Outertown, Stromness, Mainland, Orkney, 26th June 1932, JAMES SINCLAIR. Native. Rare. Anthers minute. Confirms the record of this species for v.-c. 111 by the Rev. George Low, as *Poa loliacea* in *The History of the Orkney Islands*, by the Rev. George Barry, D.D., first ed., p. 268 (1805). Removes Orkney (111) from the doubtful records of this species in Druce's *Comit. Fl.* under *Desmazeria loliacea* (Huds.) Nyman.

FESTUCA, all determined by W. O. HOWARTH.

826/12. FESTUCA CAPILLATA Lam. At 2500 ft. on Ben Vrackie, East Perth; at 2800 ft. on the Cairnwell, East Perth, form approaching *F. ovina*, J. E. LOUSLEY.

826/9. F. OVINA L., var. or forma VIVIPARA. At 2800 ft. on the Cairnwell, East Perth, J. E. LOUSLEY.

*826/11. F. LONGIFOLIA Thuill. Camber Sands, East Sussex, J. E. LOUSLEY.

826/7. F. RUBRA L. S.W. Corrie, Ben Lawers, 3000 ft., J. E. LOUSLEY.

Var. c. DUMETORUM (L.) How. Large sandhill form, Studland Bay, Dorset; S.W. Corrie (3000 ft.), Ben Lawers, Mid Perth, J. E. LOUSLEY.

Var. e. PRUINOSA (Hack.). Portland Bill, Dorset, J. E. LOUSLEY.

Var. GENUINA Gaud. (a littoral form). Shingle near Camber Castle, East Sussex, J. E. LOUSLEY.

Var. VULGARIS Gaud. Several places about Camber Sands; Chalk cliff, Cow Gap, Beachy Head; on exposed clay cliff Fairlight Glen, near Hastings, East Sussex; Leysdown, Sheppey, E. Kent; Ben y Vrackie (2000 ft.), East Perth; near Mychett Lake, Surrey, J. E. LOUSLEY.

Var. e. GLAUCESCENS H. & H. Newhaven, Camber Sands, East Sussex; Shoreham Harbour, West Sussex; Portland Bill, Dorset; Cliffe, West Kent, J. E. LOUSLEY.

Var. f. ARENARIA Osb. Studland Bay, Dorset; Leysdown, East Kent, J. E. LOUSLEY.

826/3. F. ARUNDINACEA Schreb., var. ORIENTALIS Hack. By sea-wall, Shoreham Harbour, West Sussex, J. E. LOUSLEY.

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†827/13. BROMUS UNIOLOIDES H.B.K. Splott, Cardiff, Glamorgan, Mrs MACALISTER HALL; near Littleton, Guildford, Surrey, G. M. ASH.

829/1 f. LOLIUM PERENNE L., var. CRISTATUM Döll. Menmarsh, Oxon, J. CHAPPLE and Miss E. VACHELL.

830/4 c. AGROPYRUM LEERSIANUM S. F. Gray. Field near Hitchin, Herts, H. PHILLIPS. Sp. non vidi.

†831/1. SECALE CEREALE L. Medina Estuary, Newport, I. of Wight, J. W. LONG.

†833/3. LEPTURUS INCURVUS (L.) Dr. Splott, Cardiff, Glamorgan, 1926, Mrs MACALISTER HALL.

†835/10. HORDEUM VULGARE L. Gravel-pit, Letchworth, Herts, H. PHILLIPS.

844/3. EQUISETUM SYLVATICUM L. Railway-bank, Hitchin, Herts, H. PHILLIPS.

851/5. ASPLENIUM ADIANTUM-NIGRUM L. Cwrt-yr-ala, near Cardiff, Glamorgan, Miss P. LEAKE.

*856/5. ASPIDIUM AEMULUM Sw. (DRYOPTERIS AEMULA Kuntze). One locality in Surrey, vide sp., teste F. W. STANSFIELD. Leg. J. G. LAWN.

*857/4. CYSTOPTERIS FRAGILIS Bernh. On old walls and rocks at many places in S. Lancs, A. TURNER.

876/12. CHARA ASPERA Willd. Little Frensham Pond, Surrey, J. G. LAWN.

NEW COUNTY RECORDS FROM "JOURNAL OF BOTANY," 1932:—

*176/34. VICIA HIRSUTA (L.) S. F. Gray. St Kilda, v.-c. 110, C. P. Petch in *J.B.*, 170, 1932.

*211/22. SEDUM ROSEUM (L.) Scop. St David's Head, Pembroke, v.-c. 45, A. H. G. Alston, C. I. & N. Y. Sandwith in *J.B.*, 237, 1932.

*328/4. GNAPHALIUM NORVEGICUM Gunner. Caithness, v.-c. 109, in Herb. R. Meinertzhagen, teste A. J. Wilmott in *J.B.*, 296, 1932.

441/1. ARCTOSTAPHYLOS UVA-URSI (L.) Spreng. Delete record for N.E. Yorks, v.-c. 62, R. J. Flintoff in *J.B.*, 235, 1932.

*537/1. MIMULUS GUTTATUS DC. Solva River, Whitchurch, Pembroke, v.-c. 45, Alston and Sandwith, *l.c.*, 238.

*543/2. VERONICA HYBRIDA L. Near Strumble Head, Pembroke, v.-c. 45, Alston and Sandwith, *ibid.*

N.B.—Correct generic number of *Veronica* in *C.F.* from 542 to 543.

553/4. PINGUICULA LUSITANICA L. Carn-ingle, near Newport, Pembroke, v.-c. 45, Alston and Sandwith, *ibid.*, cf. *Rep. B.E.C.*, 663, 1931.

*669/10. ORCHIS MACULATA L. Carn-ingle, near Newport, Pembroke, v.-c. 45, Alston and Sandwith, *ibid.*

*669/18. O. HIRCINA (L.) Crantz. Dunstable, Beds, v.-c. 30, Miss S. Tearle, comm. A. J. Wilmott, in *J.B.*, 114, 1932.

*718/16. JUNCUS MACER S. F. Gray. Preceliy Range, Pembroke, v.-c. 45, Alston and Sandwith, *J.B.*, 238, 1932.

722/1. SPARGANIUM NEGLECTUM Beeby. Whitesand Bay, St David's, Pembroke, v.-c. 45. Add to *C.F.* but not N.C.R., vide *T.B.* Supp. I, Alston and Sandwith, *J.B.*, 239, 1932.

*753/61. CAREX PAIRAEI F. Schultz. St David's, Pembroke, v.-c. 45, Alston and Sandwith, *l.c.*, 238.

*753/75. C. DIOICA L. Carn-ingle, near Newport, Pembroke, v.-c. 45, Alston and Sandwith, *ibid.*

809/3. KOELERIA BRITANNICA (Domin). *Epsom Downs, Banstead Heath, Surrey, v.-c. 17, C. E. Britton in *J.B.*, 336, 1932; *Gogmagog Hills, Cambridge, v.-c. 29, Gilmour and Stearn in Notes from the University Herbarium, Cambridge, Supplement to *J.B.*, 1932 (August), p. 7.

*825/3 b. GLYCERIA DECLINATA Bréb. Jersey, I. A. Williams in *J.B.*, 113, 1932.

*827/19(2). BROMUS LEPIDUS O. R. Holmberg = B. BRITANNICUS I.A.W. One plant, Jersey, I. A. Williams, *ibid.*

*851/4. ASPLENIUM OBOVATUM Viv. (LANCEOLATUM Huds.). Near Goathland, N.E. Yorks, v.-c. 62, F. Druce in *J.B.*, 51, 1932. Correct authority in *C.F.* from Vis. to Viv.

×POTAMOGETON BENNETTII Fryer.

William Harrison Pearsall.

Fryer first described this as the hybrid *P. crispus* × *obtusifolius* in *Journ. Bot.*, 1895, i, t. 348. Two years later, Ascherson and Graebner in *Synops. Mitteleurop. Fl.*, 1897, 349, again published this hybrid as being the same combination. Much later, in *Pots. Brit. Isles*, 1915, 53, it is more fully described and figured (t. 33) and Fryer now considers it "probably a hybrid between *P. crispus* and *P. obtusifolius* or *P. Friesii.*" His figure (4) of the stem-section was apparently drawn from a stem which had been subjected to pressure before the section was cut. It is therefore misleading. He states (p. 53) that the stem is " intermediate in compression and general facies between the stems of *P. crispus* and *P. obtusifolius.*" This is not so, as can be readily seen by examining the stem-sections of these two species. Both are oblong, twice as long as broad, with the long sides furrowed—*obtusifolius* very slightly, *crispus* more deeply. It is conceivable, therefore, that the stem of any hybrid between these two species would have an oblong stem-section whose L/B ratio would be roughly 2: 1. The stem-section of ×*P. Bennettii* is not at all of this shape, but broadly elliptical as in *P. pusillus*, the L/B ration of both being approximately 11 : 9. The evidence for *P. crispus* is seen in a deep furrow in each of the longer sides. *P. Friesii* possesses a stem more compressed (L/B 3 : 1) than that of *P. obtusifolius* and for that reason it is impossible to consider it as one of the putative parents of the hybrid. Probably the tendency of × *P. Bennettii* to produce fascicles of small linear leaves—as is the case with *P. Friesii*—was the reason for this later suggestion of Fryer. However, Dr J. A. Hagström (*Crit. Res.*, 1916, 63) eventually published his opinion—mainly based on anatomical data—that × *P. Bennettii* was the hybrid *P. crispus* × *pusillus*, and in the *L.C.*, 1925, No. 1959, Mr Arth. Bennett admitted the determination.

In my judgment many of the faulty determinations of Potamogeton species in the past have been due to the critical examination of dried specimens with a lens only—rather than that of fresh plants under the microscope. Fryer states (*l.c.*, 54) that the leaves are " entire or with very minute spine-like serrulations toward the apex, not visible to the naked eye nor when dried." This statement is incorrect in some particulars, and needs considerable modification in others. While it is true that authentic examples of × *P. Bennettii* may possess a few entire leaves, other leaves of the same plant will invariably show the minute marginal denticulations which are characteristic of this hybrid. If all the leaves of the plant are entire it is not × *P. Bennettii* but probably *P. obtusifolius*, *P. Friesii*, or a young form of *P. crispus*—each of which is frequently confused with the hybrid. ×*P. Bennettii* is founded upon a plant gathered from Wood Pond, Grangemouth, Stirlingshire, 1890, by Messrs R. Kidston and Col. J. S. Stirling. They thought it was *P. obtusifolius* but others considered it to be *P. crispus*. The " very minute spine-like serrulations towards the apex " would be more correctly described as minute marginal denticulations—or irregular bulges in the marginal cell-walls suggesting the bases of abraded serrulations. They are usually more numerous " towards the apex " but may frequently be found along the whole length of the margins of very young leaves. They are, of course, " not visible to the naked eye " and usually not even to a good ×6 lens, but require a ⅔ in. microscopic objective for their discovery and examination. The statement " nor when dried " is entirely incorrect. I have seen them quite distinctly in scores of cases on good dried material. It is, however, only fair to add that in plants which have been badly dried or carelessly pressed—and also in much Herbarium material—the leaf-margins invariably curl inward and cannot be examined without detaching the leaf for the purpose of soaking it thoroughly, then carefully flattening the margins and examining them while still wet under a cover-slip. No subsequent examination can compare with that of fresh material. I decline, under any circumstances, to examine plants which have been permanently pasted to their mounts.

As in the case of all hybrids, ×*P. Bennettii* varies considerably and simulates at times more closely one or other of the putative parents, especially *P. crispus*, f. *serratus* Huds. It also frequently bears much resemblance to *P. obtusifolius* or *P. Friesii*. It grows most often among or near *P. crispus* and I have repeatedly found fragments of this species among collections of ×*P. Bennettii* and vice versa. Its superficial resemblance to one of the three species named is so close that I am convinced it is frequently overlooked on that account. A prominent characteristic of ×*P. Bennettii* is the ± liberal production of axillary fascicles of small linear leaves at intervals on the stem. These leaves greatly resemble those of *P. obtusifolius* or *P. Friesii* and are in strong contrast to the larger *crispus*-like leaves on the same plant. Moreover they are the leaves which afford most evidence of hybridity.

Up to the present ×*P. Bennettii* has been found only in Stirlingshire and Surrey. From the former I have seen authentic examples collected by Messrs R. Kidston and/or Col. J. Stirling in 1890, 1894 and 1897, and by the late Dr G. C. Druce in 1930. From Surrey I have examined specimens from the Tillingbourne at Shere, 1909, W. Biddiscombe (Hbm. C. E. Salmon) in *Herb. Mus. Brit.*; Shere, 1912, C. E. Salmon; and Albury, 9th October 1932, J. E. Lousley. In the *L.C.* only one vice-county (Stirlingshire) is given for this hybrid species. I am unable to explain this error, as Mr Arth. Bennett recorded the plant for Surrey in *Journ. Bot.*, 1895, 2, and this record, together with that of Shere, 1912, were given in the late C. E. Salmon's MS. (see *Fl. Surrey*, 1931, 620).

A detailed description of any hybrid is always misleading from the fact that the plant varies between the extreme forms of one or other of its parents and collectors too readily assume that any given plant will agree *in toto* with the description. This is not necessarily the case. Fryer's description (*Pots. Brit. Isles*, 1915, 53-55) is admirable so far as it goes but was drawn up from a cultivated plant and is, moreover, far too rigid. The brief notes given herewith are mainly intended to stimulate field-work and to correct current misconceptions as to this plant. Fryer (*l.c.*, 56) states that the " habit is intermediate between that of *P. crispus* and *P. obtusifolius*." I should prefer to substitute *P. Friesii* for the latter species. The larger stem-leaves are never so broad as those of *P. crispus*, nor are their margins undulate ("crisped"), or strongly serrulate as in that species. They should not be mistaken for those of *P. obtusifolius* as they are too broad, too short and more tapering at each end. The midrib is very wide and conspicuous, being bordered by rows of elongate lacunae. Usually the leaves are 3-nerved, but very frequently there are 5 in the lower part (influence of *P. crispus*). ×*P. Bennettii* has a strong tendency to produce axillary fascicles of shorter and smaller linear leaves and in the autumn horny deciduous winter-buds at the ends of its terminal shoots. The minute marginal denticulations are easily abraded on the older leaves by friction and therefore it is imperative that the uninjured clean young leaves should be preferred for microscopic examination. I have never seen fruits on this plant and vegetative reproduction appears to be the method normally employed. As *P. crispus* and *P. pusillus* require different ecological conditions for the development of their respective root-systems they are seldom found in close proximity. Moreover, *P. crispus* prefers shallower water than *P. pusillus* and maintains its leaves and fruiting spikes for a longer period on the surface of the water than any other British species of the genus.

CORRECTIONS AND ADDITIONS TO PREVIOUS REPORTS.

PATRICK M. HALL.

These notes have been compiled with three principal objects in view:—

I. The correction of ordinary typographical errors;
II. To keep accurately posted the *British Plant List*, second edition, 1928, with additional genera, species and varieties recorded in the *B.E.C. Reports* from year to year, and to insert these in their proper numerical or alphabetical sequence; and
III. To keep accurately posted the printed record of the vice-comital distribution of British (but not Irish) Plants, provided by *Topographical Botany* (ed. II) with its *Supplements* and by the *Comital Flora*.

Corrections under the third heading will therefore be concerned with New County Records and will be principally of three kinds:—

(a) The addition, where omitted, of the asterisk sign indicating N.C.R., where the species has not been recorded for the vice-county in question either in the *Comital Flora* or in *Topographical Botany* and its *Supplements*;
(b) To indicate discrepancies between the *Comital Flora* and *Topographical Botany*, including its *Supplements*. The expression used below that a species is not given for a certain vice-county in *Topographical Botany* and *Supplements* may be taken in every case to imply that it *is* so given in the *Comital Flora*. These records, not having appeared in *Topographical Botany* and *Supplements*, are to that extent new county records, but having appeared in the *Comital Flora* it seemed advisable to separate them from class (a) above; and
(c) To indicate where other additions to the *Comital Flora* are necessary. Many cases occur in recent Reports where records have been marked * but even so have not found their way into the *Comital Flora*.

The following abbreviations have been used, other than those that are already familiar, such as *Rep. B.E.C.*, N.C.R., *Br. Pl. List*, etc:—

T.B.=*Topographical Botany*, second edition, 1883.
T.B. Supp. I=*Supplement to T.B.*, published in the *Journal of Botany* from March 1905 onwards, and including records published up to the end of 1903.
T.B. Supp. II=Second *Supplement to T.B.*, published in the *Journal of Botany* from May 1929 onwards, and including records published up to the end of 1925.

T.B. and *Supps.*=*T.B.* with both its *Supplements.*
C.F.=*The Comital Flora of the British Isles*, by the late Dr G. C. Druce, published in 1932.

REP. B.E.C. FOR 1926, VOL. VIII, PART I.

Note.—In this Report plants were numbered in sequence corresponding to the numbers in the *first* edition of the *British Plant List.* The numbers given in brackets are the corresponding numbers for the *second* edition and for the *Comital Flora.*

p. 103. 33 (6/12). Not given for W. Gloster, v.-c. 34, in *T.B.* and *Supps.*

40 (6/24). Not given for S. Hants, v.-c. 11, in *T.B.* and *Supps.*

41 *peltatus* (6/25). Not given for Glamorgan, v.-c. 41, in *T.B.* and *Supps.*

41 *pseudofluitans* (6/26). Not given for N. Hants, v.-c. 12, and W. Sussex, v.-c. 13, in *T.B.* and *Supps.*

Add * N.C.R. for Essex, v.-c. 19.

49 (7/2). Not given for Kincardine, v.-c. 91, in *T.B.* and *Supps.*

The distribution given for *Caltha radicans* on p. 9 of *C.F.* is entirely incorrect, being in fact the distribution of *Trollius.* Note, however, that the total number of vice-counties of the latter plant should be 63 and not 53, as the numbers 46, 50 and 62, 70 should read 46-50 and 62-70, making an addition of ten. The correct distribution of *C. radicans*, according to the *Supplements* of *T.B.*, is 49, 78, 81, 88-90, 92, 94, 96-98, 105-108, to which must be added 91 above, and 52 Anglesea, vide *Rep. B.E.C.*, 1930, p. 332.

88 (22/1). Add * N.C.R. for Selkirk, v.-c. 79, and place in brackets.

Not given for Kincardine, v.-c. 79, in *T.B.* and *Supps.*

p. 106. 252 (65/1). Not given for S. Lincs, v.-c. 53, in *T.B.* and *Supps.*

p. 107. 292 (88/1). "*Montana*" was an error for "*stagnina*," vide *Rep. B.E.C.*, 1927, p. 558. *T.B.* gives S. Lincs, v.-c. 53, for *stagnina*, whereas *C.F.* gives v.-c. 54. Woodhall Spa is in N. Lincs, v.-c. 54, so that the *C.F.* entry is confirmed, but it appears that 53 should also be added to *C.F.* on account of the *T.B.* record.

304 *arvatica* (88/29). Add * N.C.R. for E. Cornwall, v.-c. 2.

p. 108. 304 *variata* (88/15). Add * N.C.R. for N.W. Yorks, v.-c. 65.

304 *Lejeunei* (88/19). Add * N.C.R. for Bucks, v.-c. 24.

316 (89/4). Not given for Kincardine, v.-c. 91, in *T.B.* and *Supps.*

p. 110. 488 (127/15). Not given for Brecon, v.-c. 42, in *T.B. Supp. II.*

518 (138/1). Add * N.C.R. for Lanark, v.-c. 77, and place in brackets.

562 (153/1). Not given for S. Hants, v.-c. 11, in *T.B.* and *Supps.*, but adventive.

596 (154/3). Not given for Stafford, v.-c. 39, in *T.B.* and *Supps.*

p. 111. 691 (176/9). Not given for Stafford, v.-c. 39, in *T.B.* and *Supps.*, but adventive.

p. 112. 909 *alpestris* (190/8). Not given for Kincardine, v.-c. 91, in *T.B. Supp. II.*

pp. 112 and 113. 909 *pratensis* (190/2). Not given for Hereford, v.-c. 36; Durham, v.-c. 66; Peebles, v.-c. 78, and Elgin, v.-c. 95, in *T.B. Supp. II.*

Add * N.C.R. for Salop, v.-c. 40, and Cheviot, v.-c. 68.

p. 113. 909 *acutidens* (190/9). Not given for Fife, v.-c. 85, in *T.B. Supp. II.*

909 *tenuis* (190/7). Not given for Herts, v.-c. 20, in *T.B. Supp. II.*

909 *subcrenata* (190/6). Not given for W. Gloster, v.-c. 34, in *T.B. Supp. II.*

925 (194/5). Add to *C.F.*, N. Hants, v.-c. 12.

926 (194/6). Add to *C.F.*, Fife, v.-c. 85.

933 (194/11). Add to *C.F.*, N.W. Yorks, v.-c. 65.

pp. 113 and 114. 934 and 935 (194/12). Add to *C.F.*, Fife, v.-c. 85; Mid Perth, v.-c. 88; S. Aberdeen, v.-c. 92.

p. 114. 941 (194/19). Add to *C.F.*, Fife, v.-c. 85; Kincardine, v.-c. 91; Clyde Islands, v.-c. 100.

943 (194/21). Add to *C.F.*, N. Hants, v.-c. 12; Durham, v.-c. 66.

p. 115. 1053 (220/9). Omitted from *C.F.* although marked here with * N.C.R. for Essex, v.-c. 19.

p. 118. 1399 (383/8). Omitted from *C.F.* although marked here with * N.C.R. for Stafford, v.-c. 39.

p. 123. 1665 (431/2). Not given for S. Hants, v.-c. 11, in *T.B.* and *Supps.*

1667 (433/1). Not given for Durham, v.-c. 66, in *T.B.* and *Supps.*

1672 (435/2). Not given for Kincardine, v.-c. 91, in *T.B.* and *Supps.*

1676 (435/6). Not given for Kincardine, v.-c. 91, and Dumbarton, v.-c. 99, in *T.B.* and *Supps.* and add to *C.F.*, Dumbarton, v.-c. 99, in brackets.

p. 124. 1712 (456/1). Add * N.C.R. for Cornwall, v.-c. 1 or 2, in brackets.

p. 125. 1765 (480/9). Not given for W. Ross, v.-c. 105, in *T.B.* and *Supps.*

p. 127. 1939 (545/15). Not given for Kincardine, v.-c. 91, in *T.B. Supp. II.*

1969 (550/8). Not given for Worcester, v.-c. 37, in *T.B.* and *Supps.*

1988 (558/1). Not given for Orkney, v.-c. 111, in *T.B.* and *Supps.*

1989 (558/2). Not given for W. Ross, v.-c. 105, in *T.B.* and *Supps.*

p. 128. 1993 (558/6). Not given for Orkney, v.-c. 111, in *T.B.* and *Supps.*

1997 *gentilis* (558/10). Not given for Leicester, v.-c. 55, in *T.B.* and *Supps.*

1997 *gracilis*
1998 (558/11). Stow Bedon is in W. Norfolk, v.-c. 28. Add * N.C.R. and also for E. Gloster, v.-c. 33.

1999 (558/12). Not given for Northumberland, v.-c. 67, in *T.B.* and *Supps.*

p. 129. 2103 (593/1). Add * N.C.R. for W. Kent, v.-c. 16 (omitted from *C.F.* although the other record from Cumberland is included).

p. 130. 2160 (611/5). Not given for Essex, v.-c. 19, in *T.B. Supp. II.* Add * N.C.R. for Haddington, v.-c. 82, and W. Ross, v.-c. 105 (the latter though marked * here is omitted from *C.F.*).

p. 133. 2283 (650/16). This should read, Helvellyn, Westmorland, v.-c. 69.

p. 134. 2316 *leptochila* (668/3). Add to *C.F.* although marked here with * N.C.R. for Berks, v.-c. 22.

p. 135. 2327 *ericetorum* and *maculata* (669/10). Add * N.C.R. for W. Norfolk, v.-c. 28. Not given for S. Hants, v.-c. 11; Bedford, v.-c. 30; Kincardine, v.-c. 91; N. Aberdeen, v.-c. 93; Elgin, v.-c. 95, in *T.B. Supp. II.*

After " Ashdown Forest " for " Surrey " read " East Sussex."

Note.—It is very curious that the compilers of *T.B. Supp. II.* should not have recorded *O. ericetorum* from S. Hants or Dorset, seeing that this plant was first described in Linton's *Flora of Bournemouth.*

2338 (674/1). Not given for Glamorgan, v.-c. 41, in *T.B.* and *Supps.*

p. 136. 2382 (689/1). Add * N.C.R. for E. Gloster, v.-c. 33.

p. 137. 2467 (723/1). Not given for S. Devon, v.-c. 3, in *T.B.* and *Supps.*

2527 (744/1). Not given for S. Hants, v.-c. 11, in *T.B.* and *Supps.*

p. 138. 2533 (746/2). Not given for W. Ross, v.-c. 105, in *T.B.* and *Supps.*

p. 139. 2629 (753/75). Add to *C.F.*, S. Devon, v.-c. 3, although marked here with *.

p. 140. 2690 (782/1). Add to *C.F.*, Notts, v.-c. 56.

No attempt has been made in *C.F.* to distinguish between indigenous and adventive records of this species.

p. 142. 2785 (826/7). Not given for Surrey, v.-c. 17, in *T.B.* and *Supps.*

p. 142. 2786 (826/8). Add to *C.F.*, Durham, v.-c. 66, although marked here with *.

p. 144. 2909 (856/10). Add to *C.F.*, Berks, v.-c. 22, although marked here with *.

2933 (872/3). Add to *C.F.*, Glamorgan, v.-c. 41, although marked here with *.

p. 192. Under Cornwall—*V. anglica.* Truro may be v.-c. 1 or 2. *C.F.* gives 2 only.

V. variata. There are two St Justs. The *C.F.* map shows St Just in v.-c. 2, but there is also one in v.-c. 1 on the Land's End Peninsula.

p. 193. Under Wilts—*segetalis.* Add * N.C.R. for N. Wilts, v.-c. 7.

Under Hants—*variata.* Add * N.C.R. for N. Hants, v.-c. 12.

monticola. Odiham is in N. Hants, and *C.F.*, which gives v.-c. 11, should be altered to read 12.

Under Sussex—*agrestis.* Hellingly is in E. Sussex. Add * N.C.R. for v.-c. 14.

Lloydii. Newmarket is in E. Sussex. Add * N.C.R. for v.-c. 14.

p. 194. Under Kent—*cantiana.* These stations are in W. Kent and *C.F.*, which gives v.-c. 15, should be altered to read 16.

p. 196. Under Berks—*variata.* Add * N.C.R. for v.-c. 22.

p. 203. Under Lancashire—*arvatica.* Add * N.C.R. for S. Lancs, v.-c. 59 (Hightown).

Pesneaui. Add * N.C.R. for S. Lancs, v.-c. 59 (Southport).

Under Yorkshire—*Deseglisei.* Add * N.C.R. for N.E. Yorks, v.-c. 62 (Thirsk).

obtusifolia. Add * N.C.R. for N.E. Yorks, v.-c. 62, vice "York" in *C.F.*, and for M.-W. York, v.-c. 64.

ruralis. Add * N.C.R. for N.E. Yorks, v.-c. 62.

contempta. Add * N.C.R. for N.E. Yorks, v.-c. 62, vice "Thirsk" in *C.F.*

Lloydii. Add * N.C.R. for N.E. Yorks, v.-c. 62.

p. 204. Under Northumberland—*monticola.* Doddington is in Cheviotland, v.-c. 68: correct *C.F.*, which gives 67.

p. 221. Under ×*M. hircina* (558/8). Add * N.C.R. for N. Somerset, v.-c. 6; Herts, v.-c. 20, and N. Aberdeen, v.-c. 93.

p. 222. ×*M. palustris.* This appears in *Br. Pl. List*, p. 90, under 558/7 as *paludosa.*

×*M. villoso-nervata.* This is shown in *Br. Pl. List*, p. 90, under 558/3 in heavy black type as if recording a hybrid between *longifolia* and *villoso-nervata*. It should read ×*spicata* = *villoso-nervata* in the same type as and parallel to *Nouletiana*.

REP. B.E.C. FOR 1927, VOL. VIII, PART III.

p. 299. For 1/5 read 1/2. *Rep. B.E.C.*, 1928, p. 890, corrects *orientalis* to *Flammula*.

p. 301. For 48/3 read 48/6.

p. 309. For 423/85 read 423/86.

p. 384. 5/1. *T.B.* gives "error ?" for S. Devon, v.-c. 3, and *C.F.* gives [3 ?]. Correct both, and add * N.C.R. in confirmation.

p. 385. 6/20. Add * N.C.R. for Cardigan, v.-c. 46.

6/22. Add * N.C.R. for Cardigan, v.-c. 46.

14/1. Add * N.C.R. for Carmarthen, v.-c. 44.

p. 388. 88/6. Not given for Northants, v.-c. 32, in *T.B.* and *Supps.*

p. 389. 88/20. Add * N.C.R. for Cardigan, v.-c. 46.

88/22. Read W. Suffolk.

88/24. Add * N.C.R. for S. Aberdeen, v.-c. 92.

88/34. Add * N.C.R. for E. Perth, v.-c. 89, and W. Ross, v.-c. 105.

88/35. Add * N.C.R. for N. Aberdeen, v.-c. 93.

pp. 390 and 391. 105/4. Add * N.C.R. for S. Devon, v.-c. 3; N. Essex, v.-c. 19, and Glamorgan, v.-c. 41.

p. 391. 106/1. Add * N.C.R. for Herts, v.-c. 20, and place in brackets.

p. 392. 155/3. Not given for Rutland (Leicester), v.-c. 55, in *T.B.* and *Supps.*

p. 394. 189/4. Add * N.C.R. for E. Gloster, v.-c. 33. Not given in *T.B.* and *Supps*, and bracketed in *C.F.*

p. 395. 190/8. Not given for Renfrew, v.-c. 76, in *T.B. Supp. II.*

194/9. Add * N.C.R. for Oxford, v.-c. 23.

p. 396. 194/11. Add * N.C.R. for Stafford, v.-c. 39, and Derby, v.-c. 57.

194/12 and 194/13 (both under *R. glauca* agg. of *C.F.*). Add * N.C.R. for Surrey, v.-c. 17; Berwick, v.-c. 81; Easterness, v.-c. 96, and Dumbarton, v.-c. 99.

194/16 (under *R. agrestis* agg. of *C.F.*). Add * N.C.R. for Berwick, v.-c. 81.

194/19 and 194/20 (both under *R. tomentosa* agg. of *C.F.*). Add * N.C.R. for Roxburgh, v.-c. 80; N. Aberdeen, v.-c. 93, and Easterness, v.-c. 96.

194/21. Add * N.C.R. for S. Wilts, v.-c. 8.

p. 397. 194/23. ×*R. Sabini* appears in *C.F.* as 194/23(2).
198/4. Add †.
207/7. For * read †.
p. 401. 383/4. For Holmesby read Holmsley.
383/8. Not given for Berks, v.-c. 22, in *T.B.* and *Supps.*
383/12. Add †.
396/1. Not included in *C.F.*, 91 to be added in brackets.
p. 402. 402/1. Add * N.C.R. for Easterness, v.-c. 96.
405/8. Add to *C.F.*, Dorset, v.-c. 9, and M.W. Yorks, v.-c. 64.
405/11. Correct number in *C.F.* from 405/9.
410/1. Add * N.C.R. for S.E. Yorks, v.-c. 61.
p. 403. 417/1. Add †.
For 419/218 read 419/208.
p. 404. For 423/51 (*T. cyanolepis*) read 423/50.
p. 406. 425/1. Bracketed for v.-c. 6 in *C.F.*
425/10. Add to *Br. Pl. List* and add †.
427/3. For *integrifolia* read *integrifolius*.
435/5. Add var. *elongata* Hampe to *Br. Pl. List* as var. g.
p. 408. 480/6. Read *G. lingulata* Ag., var. *praecox* Towns. and add * N.C.R. for S. Wilts, v.-c. 8.
498/1. For *orientalis* read *officinalis*.
506/2. Add * N.C.R. for N.W. Yorks, v.-c. 65.
p. 409. 517/15. Add †.
543/3. Var. *integra* will be var. f. in the *Br. Pl. List* if valid.
545/1. Not given for W. Kent, v.-c. 16; Cumberland, v.-c. 70; Roxburgh, v.-c. 80; or W. Ross, v.-c. 105, in *T.B. Supp. II.*
545/2. Not given for W. Sussex, v.-c. 13; N.W. Yorks, v.-c. 65; or W. Ross, v.-c. 105, in *T.B. Supp. II.*
p. 410. 545/3. Not given for N.W. Yorks, v.-c. 65, or Durham, v.-c. 66, in *T.B. Supp. II.*
545/5. Not given for W. Kent, v.-c. 16; Cardigan, v.-c. 46; N.W. Yorks, v.-c. 65; Selkirk, v.-c. 79; or W. Ross, v.-c. 105, in *T.B. Supp. II.*
545/7. Not given for Cardigan, v.-c. 46, or W. Ross, v.-c. 105, in *T.B. Supp. II.*
545/10. Not given for Merioneth, v.-c. 48, in *T.B. Supp. II.*
545/14. Not given for Dorset, v.-c. 9; Surrey, v.-c. 17; or Angus, v.-c. 90, in *T.B. Supp. II.*
545/16. Not given for Cardigan, v.-c. 46, in *T.B. Supp. II.*
545/19. Not given for Cardigan, v.-c. 46; Ayr, v.-c. 75; Elgin, v.-c. 95; or W. Ross, v.-c. 105, in *T.B. Supp. II.*
p. 411. 545/21. Not given for Dorset, v.-c. 9; Oxford, v.-c. 23; Hunts, v.-c. 31; Stafford, v.-c. 39; Brecon, v.-c. 42; N.W. Yorks, v.-c. 65; or Roxburgh, v.-c. 80, in *T.B. Supp. II.*

p. 412. 558/2. Add * N.C.R. for W. Suffolk, v.-c. 26, and Brecon, v.-c. 42.
558/6. Add * N.C.R. for W. Perth, v.-c. 87.
558/9. Not given for Radnor, v.-c. 43, in *T.B.* and *Supps.*
558/10. Add * N.C.R. if Mid Perth, v.-c. 88.

p. 413. 561/5. Add * N.C.R. for Pembroke, v.-c. 45.
561/11. Add * N.C.R. for Peebles, v.-c. 78.
577/1. Add * N.C.R. for Denbigh, v.-c. 50 (included in *C.F.*).
577/9. For *salvifolius* read *salvifolia.*
579/1. Add †.

p. 414. 600/4. Add S. Wilts, v.-c. 8, to *C.F.* but given *T.B.* Not given for S. Hants, v.-c. 11, in *T.B.* and *Supps.*
600/7. Var. *microphyllum* Murr. will be var. d. in the *Br. Pl. List.*

p. 415. 600/13. Add * N.C.R., W. Gloster, v.-c. 34.
600/15. Var. *spicatum* Murr. will be var. c. in the *Br. Pl. List.*
For 611/7 read 611/8. Not given for W. Cornwall, v.-c. 1, in *T.B. Supp. I.* and *II.*
615/11. Omitted from *C.F.* for Dorset, v.-c. 9, but given in *T.B.*

p. 417. 628/11. Add * N.C.R. for Notts, v.-c. 56.
632/2. Add * N.C.R. for Stafford, v.-c. 39 (omitted from *C.F.*).
633/6. Add * N.C.R. for Herts, v.-c. 20.
643/2. *Br. Pl. List* gives Medik. not Willd. as the authority.
650/2. Not given for N. Aberdeen, v.-c. 93, in *T.B.* and *Supps.*

p. 419. 669/7. For *pulchriora* read *pulchrior.*
669/8. Not given for E. Kent, v.-c. 15, in *T.B. Supp. II.*
669/10. Not given for Dorset, v.-c. 9, and Glamorgan, v.-c. 41, in *T.B. Supp. II.* (as *ericetorum*).

p. 420. 702/4. Delete *. Not N.C.R. vide *T.B. Supp. I*, p. 81.

p. 421. 718/16. Add * N.C.R. for Brecon, v.-c. 42.
Delete * from record for W. Gloster.
739/1. Delete *. Not N.C.R. for *Z. palustris* agg. vide *T.B.*, p. 423.
753/4. Add * N.C.R. for Glamorgan, v.-c. 41.

p. 421. 753/12. Not given for S. Lancs, v.-c. 59, in *T.B.* and *Supps.*

p. 422. 766/2. Not given for Glamorgan, v.-c. 41, in *T.B.* and *Supps.*

p. 423. For 777/8 read 777/9 .

p. 424. 826/7. Not given for N. Wilts, v.-c. 7, in *T.B.* and *Supps.*
826/9. *paludosa* Gaud. appears in the *Br. Pl. List* as 826/12 *F. capillata* Lam.

p. 425. 830/1. For *macrostachyum* Dr. read *megastachyum* (Fr.) Dr.
844/3. Delete *. Not N.C.R. for W. Gloster, v.-c. 34, vide *T.B. Supp. II*, p. 91.

p. 432. *Armeria maritima* Willd. is not given in *C.F.* under *S. maritima* Mill. for Outer Hebrides, v.-c. 110.
Alectorolophus Drummond-Hayi Sterneck. Add * N.C.R. for 548/8 for Outer Hebrides, v.-c. 110.
Euphrasia curta Wettst. is not given for Outer Hebrides, v.-c. 110, in *T.B. Supp. II.*

p. 435. *Eleocharis uniglumis* R. & S. Add to *C.F.* under 745/2 for Outer Hebrides, v.-c. 110, but given in *T.B.*
Arrhenatherum elatius Mert. et Koch, var. *tuberosum* Aschers. Under *A. tuberosum* 795/2 add * N.C.R. for Outer Hebrides, v.-c. 110.

p. 436. *Trisetum flavescens* Beauv. *C.F.* says " not recorded for 110," and see *T.B. Supp. I*, p. 104. Add v.-c. 110 in brackets.

p. 448. For 127/27 read 127/28, vide correction *Rep. B.E.C.*, 1928, p. 890, and also *loc. cit.*, p. 611.

p. 449. 153/1. Add to *Br. Pl. List*, *M. falcata* × *sativa.*
176/26. For *stricta* read *striata.*

p. 451. For 425/ read 425/10.
516/1. For Hill read Mill., vide *Rep. B.E.C.*, 1928, p. 872.

p. 452. 525/5. Add to *Br. Pl. List*, var. b. *grandiflora* Comes.
577/9. For *salicifolia* read *salvifolia*, vide *Rep. B.E.C.*, 1928, p. 881.
596/4. For *aristulata* read *aristulatus.*

p. 454. 831/1. Calls attention to an error in *Br. Pl. List*, p. 134, where for " oat " read " rye."

p. 461. 103/9. *Sagina Reuteri.* *C.F.* omits Glamorgan, v.-c. 41, and places Pembroke, v.-c. 45, in brackets, but both are correctly given in *T.B. Supp. II*, p. 14. *C.F.* gives v.-c. 6 and v.-c. 37, the latter twice, without and with brackets. Delete the latter.

p. 509. Under *T. Pulegioides* L. (561/1).
31. Stafford. ? 31. Hunts or ? 39. Stafford. In which is Mocktree?
Add * N.C.R. for E. Gloster, v.-c. 33. Not given in *C.F.*

p. 510. The record of ×*T. oblongifolius* = *Pulegioides* × *Serpyllum* for W. Norfolk, v.-c. 28, implies by inference the presence of *Pulegioides* in that vice-county: add * with ?.

p. 515. (561/10). *Thymus neglectus.* The record for " 45. Monmouth " (which itself contains an error, 45 for 35) is corrected in *Rep. B.E.C.*, 1928, p. 890, to " 36. Hereford." This entails correcting *C.F.* and substituting 36 for 45.

p. 529. (98/9). *Lychnis Githago* Scop., var. *nicaeensis* Willd. Add to *Br. Pl. List* as var e.
(153/2). *Medicago sylvestris* Fr. Add * N.C.R. for Carnarvon, v.-c. 49, in brackets.

p. 532. (588/8). *Plantago lanceolata* L., var. *sphaerostachya* Roehl. Add to *Br. Pl. List* as var. n.
p. 558. Under "Corrections and Additions." For p. 947 read p. 974. The last two lines do not refer to *Rep. B.E.C.*, 1923, but to *Rep. B.E.C.*, 1926.

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Note.—"Plant Notes, etc.," in the 1928 *Report* contains a large number of additional species and varieties, many, but by no means all of which, have been dealt with in the paper "British Plant List—Additions and Corrections" on pages 878 et seq. of the same *Report*. In the notes below it has been assumed that the Additions and Corrections referred to above have been made to the *British Plant List*, so that the additions and corrections now made are only those omitted from the previous paper.

p. 608. 44/3. For corrections and additions to *Erophila* see later herein, *Rep.* 1929, p. 177 et seq.
p. 609. For 52/29 read 59/29.
61/15. Var. *Burchelli* will be var. c. in the *List*.
63/3. Is an addition to the *List*.
p. 610. For 88/3 d. read 88/3(2), vide p. 878, *loc. cit.*, where for *arenicolor* read *arenicola*.
p. 611. 127/28. Is an addition to the *List*.
153/4. Var. *tuberculata* will be var. j. in the *List*.
p. 612. 154/10. Is an addition to the *List*.
155/2. Var. *microphyllum* will be var. i. in the *List*.
160/5. Var. *pedunculatus* will be var. g. in the *List*.
p. 613. 176/3. Var. *imbricata* will be var. e. in the *List*.
176/6. Var. *latifolia* will be var. c. in the *List*.
Var. *angustifolia* will be var. d. in the *List*.
176/7. Var. *sessiliflora* will be var. e. in the *List*.
176/12. Var. *macrocarpa* will be var. g. in the *List*.
p. 614. 178/5. Var. *linearifolius* will be var. c. in the *List*.
(var. b. is *glabrus*, not *glabra* Trautv., vide p. 879, *loc. cit.*)
p. 615. 195/5. Var. *subserrata* will be var. d. in the *List*.
p. 616. 199/31. Is an addition to the *List*.
p. 617. 341/5. Is an addition to the *List*.
For 341/1 read 341(2) and add to the *List*.
For 341(1)/1 read 341(2)/1.
p. 618. 370/17. Var. *bicolor* will be var. b. in the *List*.
396/8. Var. *purpureocaulis* will be var. g. in the *List*.
p. 619. For 419/241 f. read 419/241 l., vide p. 880, *loc. cit.*, where for 419/211 read 419/241.
422/2. For *sordida* read *sordidus*.
p. 620. For 423/15(2) read 423/15(3), vide p. 880, *loc. cit.*, and correct name to *acinodontum*.

p. 621. For 423/15(3) read 423/15(2), vide p. 880, *loc. cit.*
For 423/25(2) read 423/25, vide p. 880, *loc. cit.*
p. 623. For 423/42 read 423/42(2), vide p. 880, *loc. cit.*
p. 626. For 423/83(3) read 423/83(4), vide p. 880, *loc. cit.*
p. 629. For 423/86(2) read 423/83(3), vide p. 880, *loc. cit.*, and correct name to *silesianum*.
p. 632. For 460/6 read 480/6.
467/2. Is an addition to the *List*.
For 472/1(2) read 472/2, and add to the *List*.
484/3. Is an addition to the *List*.
p. 633. 506/10. Var. *Lloydii* will be var f. in the *List*.
For 509/6 read 509/7, vide p. 881, *loc. cit.*
543/7. Var. *elegans* will be var. f. in the *List*.
For 543/13(2) read 543/23(2), vide p. 881, *loc. cit.*
543/19. Var. *Boraeana* will be var. e. in the *List*. (Vars. *Garckiana* and *versicolor* are vars. c. and d., vide p. 881, *loc. cit.*)
p. 634. 558/12. This hybrid is an addition to the *List*.
566/20. Is an addition to the *List*.
586/1. Var. *acrotomum* will be var. c. in the *List*.
597/2. Is an addition to the *List*.
For 600/1(2) read 600/2 in substitution for *C. Botryodes* Sm., vide *Rep. B.E.C.*, 1930, p. 367. See also p. 881, *loc. cit.*
p. 635. 600/8. ×*C. variabile*, var. *Murrii* = *album* × *Berlandieri*, substitute this name for *subcuneatum* in the *List*.
600/12. Var. *dolicophyllum* will be var. c. in the *List*.
p. 636. 600/16. Var. *dentatum* will be var. c. in the *List*.
p. 637. For 600/27(2) read 600/31.
For 600/35 *C. holopterum* read 600/34(2), vide p. 882, *loc. cit.*
600/35. *C. triangulare* read 600/18(2), vide p. 882, *loc. cit.*
618/3. This hybrid is an addition to the *List*.
p. 638. 669/5. Var. *Bartlettii* will be var. c. in the *List*.
p. 639. 669/17. Var. *sanguinea* will be var. b. in the *List*.
718/1. Var. *congestus* will be var. c. in the *List*.
718/15. Var. *repens* will be var. e. in the *List*.
737/5. Var. *Palmeri* will be var. d. in the *List*.
And delete from the *List* ? ×*praelongus*.
p. 641. 827(2). Is an addition to the *List*.
p. 723. 6/26. Add * N.C.R. for Dorset, v.-c. 9.
p. 727. 88/10. Add * N.C.R. for Wight, v.-c. 10.
p. 728. 89/4. Add * N.C.R. for Hebrides, v.-c. 110.
p. 730. 127/7. Delete *, vide *T.B. Supp. II*, p. 18.
p. 733. 155/22. Not given by *T.B.* and *Supps.* for Lincs, v.-c. 53 or 54.
166/3. Not given by *T.B.* and *Supps.* for N. Wilts, v.-c. 7, and bracketed in *C.F.*
pp. 735 and 736. 190/6. Add * N.C.R. for N. Aberdeen, v.-c. 93.

p. 736. 190/17. Add * N.C.R. for N. Aberdeen, v.-c. 93.

191/2. Add * N.C.R. for Anglesey, v.-c. 52.

p. 737. 199/1. For S. Lancs read N. Lancs.

p. 738. 207/5. Add * N.C.R. for N. Lincs, v.-c. 54.

217/6. Add * N.C.R. for Hebrides, v.-c. 110.

p. 744. 416/3. Not given by *T.B.* and *Supps.* for S. Devon, v.-c. 3.

p. 747. 453/1. Omitted from *C.F.* though marked here with *, N.C.R. for Oxford, v.-c. 23.

480/9. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110, but *baltica* is not separated from *campestris* in *C.F.*

p. 748. 506/7. Not given by *T.B.* and *Supps.* for S. Lincs, v.-c. 53.

p. 749. 527/8. Not given by *T.B.* and *Supps.* for Cumberland, v.-c. 70, and Angus, v.-c. 90, both bracketed in *C.F.*

532/3. Add * N.C.R. for Dorset, v.-c. 9.

Not given by *T.B.* and *Supps.* for Cumberland, v.-c. 70, and bracketed in *C.F.*

p. 750. 543/13. Not given by *T.B.* and *Supps.* for Huntingdon, v.-c. 31; Cumberland, v.-c. 70 and Kirkcudbright, v.-c. 73.

545/2. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110.

(The segregates of *Euphrasia* are not given in *C.F.*)

pp. 750 and 751. 545/3. Not given by *T.B. Supp. II* for N. Aberdeen, v.-c. 93, and Hebrides, v.-c. 110.

p. 751. 545/12. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110.

545/15. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110.

545/16. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110.

545/21. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110.

548/5. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110.

548/6. Not given by *T.B. Supp. II* for Hebrides, v.-c. 110.

p. 752. 558/12. Not given by *T.B.* and *Supps.* for S. Somerset, v.-c. 5; E. Kent, v.-c. 15; S. Lancs, v.-c. 59, or N. Aberdeen, v.-c. 93.

p. 753. 561/8. Add * N.C.R. for Hebrides, v.-c. 110.

573/2. Add * N.C.R. for Wight, v.-c. 10, and N. Essex, v.-c. 19.

575/1. Add †.

p. 755. 600/12. Not given in *T.B.* and *Supps.* for S. Hants, v.-c. 11.

p. 756. 612/1. Not given in *T.B.* and *Supps.* for N. Lincs, v.-c. 54.

613/1. Add †.

p. 757. 628/1. Add † if adventive, or * N.C.R. for N. Somerset, v.-c. 6, if native.

628/11. Add * N.C.R. for Norfolk, v.-c. 27 or 28, and Northants, v.-c. 32.

Not given in *T.B.* and *Supps.* for W. Sussex, v.-c. 13.

p. 758. 642/2. Not given in *T.B.* and *Supps.* for Shetland, v.-c. 112.

p. 760. 669/8. Add * N.C.R. for S. Ebudes, v.-c. 102 (var. *pulchella*).

Var. *protensa.* This record had better be deleted. I know of no place of the name of Mitcham in S. Hants, and the varietal name is without authority.

669/10. Not given in *T.B. Supp. II* for Hebrides, v.-c. 110.
For " Shadfield " read " Shedfield."

p. 761. 674/1. For " Neaton, Winchester, Hants," read " near Winchester, S. Hants."
706/4. Add †.

p. 762. 718/16. Add * N.C.R. for N. Hants, v.-c. 12, and Channel Islands.
Not given in *T.B. Supps.* for Cardigan, v.-c. 46.
737/4. Not given in *T.B.* and *Supps.* for Durham, v.-c. 66.
746/6. Not given in *T.B.* and *Supps.* for S. Lancs, v.-c. 59. First record for England.

p. 763. 746/15. Add * N.C.R. for E. Norfolk, v.-c. 27.
748/1. *C.F.* gives v.-c. 4 but not 3. Burlescombe is in v.-c. 3, which should be substituted for 4. *T.B.* and *Supps.* do not give N. or S. Devon.

p. 764. 753/63. Not given in *T.B.* and *Supps.* for Flint, v.-c. 51.
766/2. Add * N.C.R. for Lanark, v.-c. 77.

p. 766. 809/3. Add * N.C.R. for Westmorland, v.-c. 69.
824/1. Not given in *T.B.* and *Supps.* for Angus, v.-c. 90.
824/15. For * read †.

p. 767. 829/1. Var. *orgyale* will be var. j. in the *Br. Pl. List.*

p. 769/ 857/4. Not given in *T.B.* and *Supps.* for N. Lincs, v.-c. 54.

p. 783. *R. polioclados* W. Wats. should be numbered 185/72(2) in the *List*, teste *ipso.*

p. 785. *R. montanus* Wirtg. is probably an earlier name for 185/52 *R. lentiginosus* Lees.

p. 786. *R. nitidioides* W. Wats. should be numbered 185/40(2) in the *List*, teste *ipso.*

p. 794. Under Cornwall—*Pesneaui* (88/35). Add * N.C.R. for E. Cornwall, v.-c. 2.
Under Hampshire—*segetalis* (88/23). Add * N.C.R. for N. Hants, v.-c. 12.
For " Lyss " read " Liss " twice.
latifolia. Poole is in Dorset.

p. 795. Under Essex—*segetalis* (88/23). Add * N.C.R. for S. Essex, v.-c. 18.

p. 797. Under Yorkshire—*derelicta* (88/30). Add * N.C.R. for M.W. York, v.-c. 64.

p. 798. *R. auricomus* (6/4). Var. *apetalus* Wallr. will be var. e. in the *List.*
P. Rhoeas (21/2). Var. *violaceum* will be var. p. in the *List.*
S. ciliata (103/7). Var. *glabra* will be var. d. in the *List.*

p. 799. *T. dubium* (155/21). Var. *erectum* will be var. d. in the *List.*
P. rupicola (195/11). Add * N.C.R. for Derby, v.-c. 57.

p. 809. Last line but four: 558/9 var. r. will therefore be deleted from the *List.*
Last line but two: add to *List* as 558/13 var. n.

p. 817. *R. circinatus*, var. *subaquaneus*. The *Br. Pl. List* makes this var. d. of 6/22 *R. trichophyllus*. It should be altered to 6/21 var. b.

p. 819. Distribution of *R. trichophyllus*. *C.F.* gives same v.-c.s except that 74 is included and 107 omitted. Add to *C.F.* 107 which is confirmed by *T.B. Supp. I*, but delete 74 pending confirmation. *T.B.* and *Supps.* do not give 41, 48, 59, 77, 88 or 98, but on the other hand *T.B. Supp. II.* gives 12, 50, 84 and 93, which are not given here or in *C.F.* Add these numbers in brackets.

p. 822. Distribution of *R. Drouetii*. Add 86 to *C.F.* *T.B. Supp. II* gives 31, 72, 85, 93 and 112, which are not given here or in *C.F.* Add these numbers in brackets.

p. 824. Distribution of *R. radians*. Delete ? before 105 in *C.F.*, and delete also 87 given in *C.F.* but not here.

p. 825. Var. *Godronii* is placed under *R. trichophyllus* in the *Br. Pl. List* as 6/22 var. b. Now that *R. radians* has been raised to specific rank, and *Godronii* placed under it, the latter should be renumbered 6/22(2) var. b. The distribution includes v.-c. 4, 25, 30, 62-4, 111, to be added to the distribution of *radians* in *C.F.*

p. 830. *R. sphaerospermus*. Line 37 : add * N.C.R. for Dorset, v.-c. 9.

p. 832. *R. tripartitus*. Distribution : *T.B.* and *Supps.* do not give v.-c. 1 for the segregate.

p. 833. Add var. *submersus* to *Br. Pl. List* as 6/29 var. b.

p. 836. *R. lutarius*. Distribution : *C.F.* gives the same v.-c.s with the addition of 58. Cheshire, which is also given by *Supp. I.*

p. 878. p. 13, n. 88. For *arenicolor* read *arenicola*.

p. 879. Line 10 : For g. read h. ; 128/3 g. being already occupied by var. *commixtum* (Jord.), vide Additions and Corrections at beginning of *Br. Pl. List*.
Line 34 : For *glabra* read *glabrus*.

p. 880. Line 21 : For 419/211 read 419/241.
Line 44 : For 63(2) read 62(3), vide p. 625, *loc. cit.*

p. 881. Line 45 : For 1(2) read 2, vide correction to p. 634, *loc. cit.* above.

p. 882. Line 33 : For 643(3) read 643/3.

p. 883. Line 39 : This should read " Add 827(2) *Boissiera* Hochst.," vide p. 641, *loc. cit.*, where this genus is added to the *Br. Pl. List* with a single species, 827(2)/1 *Bromoides* Hochst.

(Supplement Flora of West Ross not checked through.)

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p. 18. 6/4. Var. *cervicornix* will be var. f. in the *List*.
6/22. *Godronii* is var. b., not of 6/22 *R. trichophyllus*, but of 6/22 (c.) *R. radians*. Add * N.C.R. for S. Lancs, v.-c. 59.
submersus is var. c. of 6/24 *R. heterophyllus*.

p. 19. For 34/2 read 50/9, and add to *List*. This plant, being a hybrid of two species of *Erysimum*, should be listed under that genus and not under *Cheiranthus*, in which it is erroneously included by gardeners.
×*Cheiranthus* or *Erysimum Allionii*. Add to my previous correction "F. J. Chittenden, however, in *Journal of Royal Horticultural Society*, February 1933, p. 172, shows that the correct botanical name of this hybrid is ×*E. Marshallii*."
43/1. Add var. *montana* to *List* as var. b.
43/2. Add var. b. *leiocarpa* to *List*.
Add var. c. *bracteata* to *List*.
44/2. Add var. *microcarpa* to *List* as var. c.
54/2. Add var. *syntomocarpa* to *List* as var. c.
56/2. Add var. *eriocarpa* to *List* as var. c.
Add var. *longirostris* to *List* as var. d.
59/20(2). Add to *List*.

p. 20. 61/25. Add var. *robustum* to *List* as var. b.
65/7. Add to *List*, deleting brackets and ?.
88/14. Add var. *patula* to *List* as var. b.
89/1. For *decora* read *decorum*, and add to *List* as var. d.
117/2. Add var. *violascens* to *List* as var. e.
142/2. For *trilobata* read *trilobatum*, and add to *List* as var. f.
183/10. For *lusitanicus* read *lusitanica*.
Add var. *myrtifolia* to *List* as var. b.
185/1. Add to *List*.

p. 21. 185/47. Add var. *contractifolius* to *List* as var. b.
185/. Should read 185/91(2).
185/72. Add these two hybrids to *List*.
185/73. Delete square brackets in *List*.
190/4(2). Add to *List* and correct number in *C.F.* from 6(2) to 4(2).
190/8(2). Add to *List*.
190/8(3). Add to *List* and to *C.F.*

p. 22. 196/1. Add var. *gracilis* to *List* as var. r.
197/6. For *humifusa* read *humifusus*.
239/4. Add to *List*.
279/2. Add to *List*.

p. 23. 287/2. Insert Dr. after *ovali-fructu*, and add to *List* as var. f.

345/4. Add to *List.*
For 347/14(2) read 347/15, and add to *List.*
396/9. Add words, "=*spurium* Delastre" to *List.*
405/46. Add to *List.*
407/4. Add to *List.*
p. 24. 419/22. Add var. *submaculatum* to *List* as var. c.
419/50(2). Add to *List.*
419/69(2). Add to *List.*
p. 25. 419/110. Add var. *abrasum* to *List* as var. c.
419/111(2). Add to *List* in square brackets with var. b.
For 419/171(3) read 419/171(2), and add to *List.*
p. 26. 423/17(2). This species and the following 13 species of *Taraxacum* on pp. 26 to 30 are all additions to the *List.*
p. 30. 472/3. Add to *List.*
506/1. See corrections to *M. palustris*, p. 157 et seq., 1930.
p. 31. 513/1. Add var. *integrata* to *List* as var. f.
515/10. Add to *List.*
517/18. Add to *List* with var. b.
527/19. Add to *List.*
543/8. Add to *List.*
543/11. Add var. *obscura* to *List* as var. c.
543/23(3). Add to *List.*
pp. 31 and 32. 545. Add *E. rotundifolia* to *List* as 545/12(2).
Add E. *Marshallii* to *List* as 545/12(3).
Add *E. anglica* to *List* as 545/19(2).
Add *E. eambrica* to *List* as 545/19(3).
Add *E. rivularis* to *List* as 545/19(4).
Add *E. Pseudo-Kerneri* to *List* as 545/21(2).
p. 32. 545/2. Add var. *atropurpurea* to *List* as var. c.
546/4. Add var. *breviflora* to *List* as var. b.
548/3. Add var. *ramosissimus* to *List* as var. d.
p. 33. 561/11. Add this hybrid to *List*, but for *Chamaedrys* (*glaber*) read *Pulegioides*, var. *Chamaedrys*, vide Corrections to *Rep. B.E.C.*, 1930, p. 278, 561/10—below.
p. 34. 572/4. Add to *List.*
600/8. Add var. *diversifolium* to *List* as var. z.
Add var. *multospicatum* to *List* as var. aa.
Add var. *minutospicatum* to *List* as var. bb.
p. 35. Line 1. Add var. *Leptophylloides* to *List* as var c. of 600/11.
600. Add *C. Zobelii* to *List* as 600/34(3).
600. Add *C. Probstii* to *List* as 600/34(4).
600/21. Add var. *Quinoa* to *List* as var. g.
For 600/31(2) read 600/31(3), and add to *List.* 600/31(2) is preoccupied by *C. amaranticolor*, vide *Rep. B.E.C.*, 1928, p. 882.
p. 36. 618/9. Add to *List.*
618/13. Add to *List.*

p. 37. 669/17. This hybrid is already given in the *List* under 674/1.
Line 36. For *Habenaria* read *conopsea*.
678/6. Add to *List*.

p. 38. 706/3. Add var. *Lacaillei* to *List* as var. c.

p. 40. 718/16. In *Rep. B.E.C.*, 1930, p. 282, *J. bicornis* Michx. is again changed to *macer* S. F. Gray. (The date of publication should read 1803, not 1903.)

pp. 41 and 42. 827/19(2). Add to *List* and correct number in *C.F.* from 30 to 19(2).
Add following v.-c.s to distribution given in *C.F.*, viz.:—2, 6, 8, 12, 14, 16, 21, 28, 58, 62, 64, 70, 90, 94, 111.

p. 42. 844/7(2). Add to *List*.

p. 101. 9/2. Not given in *T.B.* and *Supps.* for Glamorgan, v.-c. 41.

p. 102. 32/9. Add * N.C.R. for E. Suffolk, v.-c. 25.
35/2. Not given in *T.B.* and *Supps.* for W. Sussex, v.-c. 13.
37/1. Omitted from *C.F.*, add 112 in brackets.

p. 104. 61/2. Add * N.C.R. for Herts, v.-c. 20, as adventive.

p. 105. 88/3. Omitted from *C.F.*, add 110.

p. 107. 96/4. Add * N.C.R. for N. Devon, v.-c. 4.

p. 108. 103/9. Not given in *T.B.* and *Supps.* for Hereford, v.-c. 36, and Worcester, v.-c. 37.
112/13. Not given in *T.B.* and *Supps.* for Cambridge, v.-c. 29. Add * N.C.R. for N.E. Yorks, v.-c. 62.

p. 109. 124/1. Add * N.C.R. for W. Sutherland, v.-c. 108.
127/3. Omitted from *C.F.*, add 41.
127/15. Not given in *T.B.* and *Supps.* for N. Devon, v.-c. 4.

p. 114. 190/3. Add * for N.W. Yorks, v.-c. 65, *not* 64 as printed.
190/5. Add * for N.W. Yorks, v.-c. 65.
190/13. Not given in *T.B. Supp. II* for Durham, v.-c. 66.
190/18. Add * N.C.R. for M.W. Yorks, v.-c. 64; Westmorland, v.-c. 69; and Caithness, v.-c. 109.

p. 115. 195/13. Delete *.

p. 116. 220/6. Add * N.C.R. for Herts, v.-c. 20.

p. 118. 287/3. Not given in *T.B.* and *Supps.* for Carmarthen, v.-c. 44.
304/2. Add * N.C.R. for S. Devon, v.-c. 3, and Glamorgan, v.-c. 41.

p. 119. 368/4. Not given in *T.B.* and *Supps.* for Orkney, v.-c. 111.

p. 120. 383/4. Omitted from *C.F.*, add 10.

p. 123. For 423/25(2) read 423/25, vide *Rep. B.E.C.*, 1928, p. 880.

p. 124. For 423/83 read 423/83(2), vide *Rep. B.E.C.*, 1928, p. 880.
For 423/83(2) read 423/83(3), vide *Rep. B.E.C.*, 1928, p. 880.
For 423/88 read 423/94(2). 423/88 is preoccupied by *T. sublutescens* D. and as the Taraxaca are arranged in the *List* alphabetically *unguilobum* must appear after *triangulare*.

p. 126. 467/2. Not given in *T.B.* and *Supps.* for Shetland, v.-c. 112.

480/9. *baltica* is not given in *T.B. Supp. II* for N. Devon, v.-c. 4. Included with *campestris* in *C.F.*

p. 127. 517/9 and 517/17. Add †.

p. 128. 521/1. Delete ? after 42 in *C.F.*

p. 129. 545/16. Not given in *T.B. Supp. II* for Orkney, v.-c. 111.

pp. 129 and 130. 545/19. Not given in *T.B. Supp. II* for W. Sussex, v.-c. 13, or Monmouth, v.-c. 35, but the W. Sussex record should be queried, the plant probably being *E. anglica*, teste Pearsall.

p. 130. 553/2. Delete * which applies only to the var. *alpicola*, not to the species.

558/1. Add * N.C.R. for S. Lancs, v.-c. 59.

p. 131. 558/9. Not given in *T.B.* and *Supps.* for Angus, v.-c. 90.

558/12. Not given in *T.B.* and *Supps.* for Berks, v.-c. 22.

p. 133. 593/4. Add †.

p. 134. 600/12. Not given in *T.B.* and *Supps.* for W. Gloster, v.-c. 34.

p. 135. 615/3. Add †.

615/10. Add * N.C.R. for Derby, v.-c. 57.

621/1. Omitted from *C.F.*, add 9.

p. 136. 646/2. Not given in *T.B.* and *Supps.* for Monmouth, v.-c. 35.

650/2. Add * N.C.R. for Orkney, v.-c. 111.

p. 137. 664/1. Sixth line of paragraph; for " care " read " case."

p. 138. 669/10. Not given in *T.B. Supp. II* for Merioneth, v.-c. 48.

672/4. Add * N.C.R. for E. Kent, v.-c. 15, with ?.

p. 139. 684/4 and 684/8. Add †.

718/16. Add * N.C.R. for S. Devon, v.-c. 3.

719/6. Delete *.

p. 140. 722/1. Add * N.C.R. for Leicester, v.-c. 55.

744/1. Add † and place 22 in brackets in *C.F.*

p. 141. 745/4. Add * N.C.R. for Notts, v.-c. 56.

747/3. Omitted from *C.F.*, add 32.

753/4. Add * N.C.R. for Pembroke, v.-c. 45.

p. 142. 753/12. Add * N.C.R. for S. Devon, v.-c. 3. Although said to have been previously recorded, it is not given in *C.F.* or *T.B.* and *Supps.*

753/18. Delete *. Although not given in *C.F.* for v.-c. 25, it was recorded for E. Suffolk in *T.B. Supp. I*, p. 99.

753/38. Omitted from *C.F.*, add 112.

753/45. Add * N.C.R. for E. Sussex, v.-c. 14.

p. 143. 753/47. For *aquaticus* read *aquatilis*; not given in *T.B.* and *Supps.* for Cumberland, v.-c. 70.

753/58. Omitted from *C.F.*, add 111.

p. 144. 753/63. Omitted from *C.F.*, add 112.

770/3. Not given in *T.B.* and *Supps.* for N. Devon, v.-c. 4. Add * N.C.R. for Midlothian, v.-c. 83.

785/1. Add † and * N.C.R. for Wight, v.-c. 10. Not given in *T.B.* and *Supps.* for Stafford, v.-c. 39.

p. 145. 809/1. Add * N.C.R. for Notts, v.-c. 56.

809/3. Add * N.C.R. for S. Devon, v.-c. 3, and correct serial number in *C.F.* from 2 to 3.

824/1. Delete *. Recorded in *Rep. B.E.C.*, 1928, p. 766.

824/5. Add * N.C.R. for S. Hants, v.-c. 11.
Not given in *T.B.* and *Supps.* for Berks, v.-c. 22.

p. 146. 825/8. Delete *. Not N.C.R., vide *T.B. Supp. I*, p. 85.
For 827/19 read 827/19(2) and add to *C.F.* following v.-c.s:—Dorset, v.-c. 9; Oxford, v.-c. 23; Bucks, v.-c. 24; N. Lincs, v.-c. 54; Lanark, v.-c. 77; S. Aberdeen, v.-c. 92; N. Aberdeen, v.-c. 93.

p. 147. 844/5. Not given in *T.B.* and *Supps.* for N. Devon, v.-c. 4.

p. 157 et seq. "*Myosotis palustris* and its varieties," by A. E. Wade. This paper necessitates the following alterations to the *Br. Pl. List*:

506/1. *M. palustris* Hill.
Add var. a. *memor* Kittel (=*vulgaris* Coss. et Germ.).
As var. b. delete *caespititia* DC. and substitute *hirsuta* Braun.
As var. c. delete *commutata* (R. & S.) and substitute *Reichenbachiana* (Dum.) Wade.
Var. d. read *strigulosa* (Reichb.) Mert.
Var. e. read *laxiflora* (Reichb.) Mert.
Add var. f. *serotina* (Hülphers) Wade.

p. 168. *R. cruentatus* P.J.M. should be numbered 185/111(2) in the *List* teste Watson.

p. 177 et seq. "The British Erophila" by G. Claridge Druce. If the arrangement worked out in this paper is to be adopted, the genus *Erophila* will have to be renumbered in the *List* and entirely reprinted as follows:—

44. *Erophila.*
1. *verna* (L.) Meyer.
(Section A. Flexuosae Rosen).
b. *Bardinii* (Jord.) O.E.S.
c. *affinis* (Jord.) O.E.S.
d. *claviformis* (Jord.) O.E.S.
e. *cuneifolia* (Jord.) O.E.S.
f. *Salmonii* O.E.S.
g. *sparsipila* (Jord.) O.E.S.
h. *inconspicua* (Rosen) O.E.S.
i. *radians* (Rosen) O.E.S.
j. *graminea* (Rosen) O.E.S.
k. *oedocarpa* (Drabble) O.E.S.
l. *confinis* (Jord.) O.E.S.
m. *cabillonensis* (Jord.) O.E.S.
n. *pyrenaica* (Jord.) O.E.S.
o. *hirtella* (Jord.) O.E.S.
p. *rurivaga* (Jord.) O.E.S.

q. *majuscula* (Jord.) Haussk.
r. *americana* (Pers.) O.E.S.
s. *Krockeri* (Andrz.) A. & G.
t. *acrocarpa* (Brenner) O.E.S.
(Section B. Scaposae Rosen).
u. *sessiliflora* (Beck.) O.E.S.
2. *Boerhavii* (Van Hall) Dum.
b. *vindobonensis* O.E.S.
c. *crassicarpa* (Wirtg.) O.E.S.
d. *inflata* (H. C. Watson) O.E.S.
e. *decipiens* (Jord.) O.E.S.
f. *brachycarpa* (Jord.) O.E.S.
g. *muricola* (Jord.) O.E.S.
h. *Drucei* O.E.S.
i. *macrophylla* O.E.S.
j. *oxoniensis* O.E.S.
× *verna* = *E. Fauconettii* O.E.S.
3. *praecox* (Stevens) DC.
b. *Moricandii* O.E.S.
c. *virescens* (Jord.) O.E.S.
d. *subnitens* (Jord.) O.E.S.
e. *microcarpa* O.E.S.

Additions to Distribution in *C.F.*

44/1. Add Berks, v.-c. 22; Oxford, v.-c. 23 (p. 181 etc.); E. Perth, v.-c. 89 (p. 186).

44/2. Add S. Essex, v.-c. 18; Denbigh, v.-c. 50 (p. 191); Jersey and Guernsey (p. 192).

p. 193. 31. For "Hants" read "Hunts."

p. 197. For 37 Northants read 32.

p. 201. Line 1. Add var. *Druceana* to *List* as var. e. under the hybrid 558/3 × *rotundifolia*, following var. d. *villosa* (Huds.).

p. 202. Line 4. Add var. *Turreffii* to *List* as var. g. of 558/12.

p. 203. Line 14. Canty Bay is in Haddington; add * N.C.R. for v.-c. 82.

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p. 258. 21/1. Add this hybrid to *List*.

45/9(2), 49/18(2), 59/2(2), 59/24(2), 59/28(2) are all additions to *List*.

100/5. Add var. *Hanburyense* to *List* as var. k.

102/5. Add var. *glandulostricta* to *List* as var f.

p. 259. 102/6. Add var. *micrantha* to *List* as var. d.

115/4, 117/13, 125/7 are additions to *List*.

142/2. Add var. *Bryonioides* to *List* as var. g.

153/4. Add var. *Battandierii* to *List* as var. k.

153/8. Add var. *procumbens* to *List* as var. b.
155/1. Add var. *montanum* to *List* as var. d.
155/2. Add var. *anglicum* to *List* as var. j.
Add var. *amabile* to *List* as var. k.
Add var. *Borderi* to *List* as var. l.
155/37. Add var. *suaveolens* to *List* as var. b.
155/40(2). Add to *List*.
156/1. Add var. *Kralika* to *List* as var. g.
166/10(2). This name should be substituted for 166/6, vide *Rep. B.E.C.*, 1931, p. 641.

p. 260. 176/3. Add var. *galloprovincialis* to *List* as var. f.
185/1. Add this hybrid to *List*.
185/2. Add var. *sextus* to *List* as var. b.
185/7. Add var. *divaricatus* to *List* as var b.
185/14(2), 18(2), 18(3), 30(2), 35(2), 45(2) are additions to *List*.

p. 261. 185/46(2), 46(3), 46(4), 46(5), 46(6), 47(2), 49(2) are additions to *List*.
185/49(2). For *curvispinis* read *curvispinus*. Sudre's plate quoted as t. 21 should have been t. LI. The change of name is necessitated by the discovery of an earlier use of the name *R. curvispinis* by Foerster, in *Flora von Aachen* (1878).—Wm. Watson.

p. 262. 185/52(2). Add to *List*.
185/53. Add var. *Boulayi* to *List* as var. b.
185/64(2), 64(3). Add to *List*.
For 185/68(2) read 185/68.
185/80(2), 83(2), 84(2). Add to *List*.
185/89. Add var. *homoeacanthus* to *List* as var. e.
185/92(2), 99(2). Add to *List*.
For 185/100(2) read 185/109(2) already printed in *List*.
185/106. Add var. *regnorum* to *List* as var. d.
For 185/109(2) read 185/109(3) and add to *List*.
For 185/109(3) read 185/109(4) and add to *List*.

p. 263. 185/142(2). Add to *List*.
194/7. Add var. *Bartlettiana* to *List* as var. q.
194/12. Add var. *berniciencis* to *List* as var. o.
194/19. Add var. *Richardsoniana* to *List* as var. k.
Add var. *dimorpha* to *List* as var. l.
194/19(2). Add to *List*.

p. 265. 194/21. Add var. *heteracantha* to *List* as var. f.
194/23. Add var. *rivalis* to *List* as var. i.
194/30. Add to *List*, with †.

p. 265-269. 194. This note gives a re-arrangement of the sub-species, varieties and forms of *R. villosa* appearing in the *List* under the numbers 194/20 and 194/21 but no new names are added to those already in the *List*.

p. 269. 195/11(2) and 196/2(2). Add to *List*.

p. 270. 212/2 and 233/4. Add to *List*.
256/1. Add var. *condensatum* to *List* as var. b.
284/1. Add var. *undulatiforma* to *List* as var. d.
318/4(2), 318/18(2), and 318/18(3). Add to *List*.

p. 271. 318/18(4). Add to *List*.
396/5. Add var. *angustifolium* to *List* as var. c.
419/1. Add var. *subvulgare* to *List* as var. i.
Add var. *subpilosum* to *List* as var. j.
419/1(2). Add to *List*.
419/11. Add var. *filipes* to *List* as var. g.
Add var. *subglabripes* to *List* as var. h.
419/125(2), 125(3), and 125(4). Add to *List*.
For 419/125(5) read 419/140 already in the *List*.

p. 272. 419/171(3). Add to *List*.
419/184. Add var. *spilodermum* to *List* as var. b.
Add var. *pseudomaculatum* to *List* as var. c.
Add var. *spilophaeum* to *List* as var. d.
Add var. *immaculatum* to *List* as var. e.
419/184(2). Add to *List*.
419/184(3). Add to *List* in square brackets with var. *tinctum* as var. b.
For 419/184(6) read 419/184 and add *divisum* to *List* as var. f.
419/245. Add var. *subepilosum* to *List* as var. g.
419/252. Add var. *indolatum* to *List* as var. b.

p. 274. For 435/6 read 433/3 and add to *List*.

p. 275. For 497/8 read 497/9 and add to *List*. 497/8 is preoccupied by *S. brachycalyx* Boiss., vide *Rep. B.E.C.*, 1928, p. 881.
506/10. Add var. *longicalyx* to *List* as var. g.
Add var. *fallacina* to *List* as var. h., and for var. (as sub-sp. *fallacina* etc. read var. (as sub-sp.) etc.

p. 276. 506/10. Add var. *brevicalyx* to *List* as var. i.
509/1. Add var. *pustulatum* to *List* as var. b.
For 509/6 read 509/8 and add to *List*. 509/6 and 509/7 are preoccupied by *humile* Desf. and *calycinum* Viv. respectively, vide *Rep. B.E.C.*, 1928, p. 881.
517/19. Add to *List* with ?.
518(2). Add to *List* as additional genus with 518(2)/1.
525(2). Add to *List* as additional genus with 525(2)/1.
529/4. Add to *List*.
For 543/15 read 543/15(2) and add to *List*. 543/15 is *V. arvensis* L.

p. 278. 545/19. Add var. *minoriflora* to *List* as var. c.
550/3. Add var. *bidentata* to *List* as var. b.
67(2). Add to *List* as additional order with genus 553(2) and species 553(2)/1.
563/1. For *ovata* read *ovatum* and add to *List* var. c.

561/10. Add this hybrid to *List*. The second parent *Pulegioides* L., var. *Chamaedrys* (Fr.) Ronn. appears in the *List* as a synonym of 561/2 *glaber* Mill. This will now be 561/1 var. b.; var. *glaber* (Mill.) Ronn. will be var. c., and 561/2 deleted from the *List*.

p. 279. 569/6. Add var. *major* to *List* as var. c.

577/12(2), 585(2) with 585(2)/1, 592/4, 596/14. Add to *List*.

600/15. Add var. *Amarantoides* to *List* as var. d.

p. 280. 651/9 and 652/2. Add to *List*.

669/7. Add var. *planiflora* to *List* as var. e.

p. 281. 676/10 and 706/7. Add to *List*.

718/10. Add this hybrid to *List*.

718/11. Correct name in *List* to *nodulosus* Wahl.

p. 283. 718/16(2). Add to *List*.

p. 284. 737/2. Add var. *parnassifolius* to *List* as var. f.

747/4(2). Add to *List*.

p. 285. 747/5. ? delete brackets in *List*.

754(2) with 754(2)/1. Add to *List*.

p. 286. For 762/2 read 762/3 and add to *List*. 762/2 is *E. aegyptia* (L.) Pers., vide *Br. Pl. List*, p. 124, as emended by *Rep. B.E.C.*, 1928, p. 877.

For 776 read 826, the correct generic number of *Festuca*. This species is an addition to the *List* and if it is intended that it should follow *trachylepis*, it should be numbered 826/23(2), as 826/24 is *maritima*.

792/1. Add var. *minuta* to *List* as var. d.

794/5. Add var. *oleodens* to *List* as var. c.

824/2. Add var. *minor* to *List* as var. l.
Add var. *macrostachya* to *List* as var. m.

827/30. Add to *List*.

829/4. Add var. *Gaudini* to *List* as var. e.

830/4(2). Add to *List*.

p. 287. 851/4. For 1830 read 1930.

857/2. For L. read Presl.

p. 331. 2/4. Not given in *T.B.* and *Supps.* for Northumberland, v.-c. 67.

p. 332. 6/23. Not given in *C.F.* for Stirling, v.-c. 86, but see *Rep. B.E.C.*, 1921, p. 445, and *T.B. Supp. II*, p. 2.

6/26. Not given in *T.B.* and *Supps.* for Glamorgan, v.-c. 41.

6/28. Not given in *T.B.* and *Supps.* for Glamorgan, v.-c. 41.

7/2. See correction to *Rep. B.E.C.*, 1926, p. 103 above.

p. 333. 21/6. Add * N.C.R. for W. Gloster, v.-c. 34.

28/1. Add †.

32/4. Add * N.C.R. for Anglesey, v.-c. 52.

32/9. Omitted from *C.F.* for N. Somerset, v.-c. 6, although marked here *.

44/1. Omitted from *C.F.* for S. Devon, v.-c. 3, although marked here *.

45/6. Add * N.C.R. for Easterness, v.-c. 96.
54/20. Add * N.C.R. for Stirling, v.-c. 86.
p. 334. 55/2. Not given in *T.B.* and *Supps.* for Anglesey, v.-c. 52.
For 59/16(2) read 59/15(2), vide *Rep. B.E.C.*, 1928, p. 878.
p. 335. 60/1. Not given in *T.B.* and *Supps.* for Anglesey, v.-c. 52.
p. 336. Line 3. Delete =.
Line 8 and 16. For S. Hants read N. Hants.
88/27. Add * N.C.R. for S. Devon, v.-c. 3.
89/4. Not given in *T.B.* and *Supps.* for Bedford, v.-c. 30, or Anglesey, v.-c. 52.
p. 337. 96/2. Add * N.C.R. for Argyll, v.-c. 98.
96/2(2). Add to *List*.
p. 338. 102/17. Add to *List*.
103/7. Add * N.C.R. for Glamorgan, v.-c. 41.
104/2. Not given for the segregate in *T.B. Supp. II*, p. 15, for N. Somerset, v.-c. 6.
108/2. Add * N.C.R. for N. Wilts, v.-c. 7, and Anglesey, v.-c. 52.
112/13. Add * N.C.R. for N. Somerset, v.-c. 6.
p. 339. 116/1. Bracketed in *T.B.* for Dorset, v.-c. 9.
127/1. The * applies to the var. only, not to the species.
133/3. Add * N.C.R. for S. Hants, v.-c. 11.
p. 340. 133/4. Add * N.C.R. for Hereford, v.-c. 36, and Rutland, v.-c. 55.
153/2. Add * N.C.R. for W. Cornwall, v.-c. 1, and W. Sussex, v.-c. 13, both adventive.
p. 341. 155/3. Delete from *C.F.* " not in Channel Islands " and add " Jersey ? native."
155/15. Add * N.C.R. for Stirling, v.-c. 86.
p. 342. 183/2. For Scop read Deep.
p. 343. 185/7. Add var. *anglicanus* to *List* as var. c.
p. 344. For 185/13 read 185/13(2), vide *Rep. B.E.C.*, 1931, p. 641.
p. 345. 185/25. Add ×*Lindleianus* to *List*.
p. 347. 185/45(3). Add to *List*.
p. 350. 185/108(2). Add to *List*.
For 185/126 read 185/120 and add var. *saltuum* to *List* as var. b.
185/127. Add var. *nudifolius* to *List* as var. b.
p. 351. For 190/8(2) read 190/8(3), vide *Rep. B.E.C.*, 1929, p. 21. Add record for Mid Perth, v.-c. 98, to *C.F.*
190/11. Add to *C.F.*, M.W. Yorks, v.-c. 64, vice Wharfedale.
p. 352. 194/12. Add * N.C.R. for E. Perth, v.-c. 89.
195/2. Delete *.
p. 353. 211/1. Not given in *T.B.* and *Supps.* for Wigtown, v.-c. 74.
211/6. Delete *.
p. 354. 225/2. Add * N.C.R. for Durham, v.-c. 66, bracketed in *C.F.*, and given with ? in *T.B.*
247/5. Add * N.C.R. for Radnor, v.-c. 43.

263(2). See *Distributor's Report* for 1931, p. 829, and correction for it, below.
p. 355. For 213/5 read 312/5.
301/5. Add to *List*.
p. 356. For 341/2 read 341/3.
p. 357. 371/3. Add * N.C.R. for Stirling, v.-c. 86.
383/8. Add * N.C.R. for Anglesey, v.-c. 52.
383/10. For Highbride read Highbridge.
p. 358. 405/8. Add * N.C.R. for Wigtown, v.-c. 74.
405/11. Add * N.C.R. for S. Lincs, v.-c. 53, and correct serial number in *C.F.* to 11.
For 405/35 read 405/15.
416/10. Not given in *T.B.* and *Supps.* for Anglesey, v.-c. 52.
p. 360. 425/2. Add * N.C.R. for Leicester, v.-c. 55.
425/4. Add * N.C.R. for Anglesey, v.-c. 52, bracketed in *C.F.* and given with ? in *T.B.*
435/4. Not given in *T.B.* and *Supps.* for Berks, v.-c. 22.
446/7. Add * N.C.R. for Devon, v.-c. 3 or 4, with ?.
p. 361. 457/2. Add * N.C.R. for Denbigh, v.-c. 50.
478/7. Delete *; not N.C.R., vide *T.B. Supp. I*, p. 58.
p. 362. 503/4. Add to *List*.
p. 363. For 527/7 read 527/1 and for *foliosum* read *Phlomoides*.
539/1. Delete *; not N.C.R., vide *T.B. Supp. I*, p. 58.
543/8. Add var. *dasypodon* to *List* as var. g.
p. 364. 545/3. Not given in *T.B. Supp. II* for W. Perth, v.-c. 87.
545/5. Not given in *T.B. Supp. II* for Durham, v.-c. 66; Wigtown, v.-c. 74; and Mid Perth, v.-c. 88.
545/15. Not given in *T.B. Supp. II* for Brecon, v.-c. 42; Durham, v.-c. 66; Dumfries, v.-c. 72; and Angus, v.-c. 90.
For 545/19 read 545/19(2).
548/1. Not given in *T.B. Supp. II* for N. Aberdeen, v.-c. 93.
548/5. Not given in *T.B. Supp. II* for S. Devon, v.-c. 3.
For 550/11 read 550/1.
p. 365. Line 6. For Vadish read Vachell.
558/2. Not given in *T.B.* and *Supps.* for Leicester, v.-c. 55.
558/10. Not given in *T.B.* and *Supps.* for N. Somerset, v.-c. 6.
p. 366. 561/10. Add * N.C.R. for Anglesey, v.-c. 52; N.W. Yorks, v.-c. 65; and Ayr, v.-c. 75.
577/2. Add * N.C.R. for W. Gloster, v.-c. 33, but place in brackets as adventive.
p. 367. 577/4. Not given in *T.B.* and *Supps.* for Wigtown, v.-c. 74.
600/5. Bracketed for Dorset, v.-c. 9, in both *C.F.* and *T.B.*
p. 368. 600/13. Add * N.C.R. for Anglesey, v.-c. 52.
600/24. Add var. *latifolium* to *List* as var. b.
611/9. Not given in *T.B. Supp. II* for Glamorgan, v.-c. 41.
627/1. Add * N.C.R. for Glamorgan, v.-c. 41.
p. 369. 646/2. Not given in *T.B.* and *Supps.* for Kirkcudbright.

650/5. Add to *C.F.*, Wigtown, v.-c. 74, but not N.C.R., vide *T.B. Supp. II*, p. 63.
653/2. Add * N.C.R. for Stirling, v.-c. 86.
p. 370. 667/3. For B. L. M. Syringe read R. L. M. Synge.
668/3. For *Helleborus* read *Helleborine*.
Add * N.C.R. for S. Hants, v.-c. 12, and add " Selborne, N. Hants, * v.-c. 12, R. L. M. Synge, both ex P. M. Hall."
669/7. For Bowne read Bourne and insert " add " before Holmsley.
669/10. Not given in *T.B. Supp. II* for Carnarvon, v.-c. 49; Anglesey, v.-c. 52; and Argyll, v.-c. 98.
For N. Yorks read M.W. Yorks, and add * N.C.R. for v.-c. 64.
p. 371. 669/11. Add * N.C.R. for Argyll, v.-c. 98.
Insert " N. Hants " after Micheldever, and " and " after Owslebury.
669/12. For York read M.W. Yorks, and add * N.C.R. for v.-c. 64.
669/18. " Morestead, near Whitchurch, S. Hants," is a confusion; it should either read " Morestead, near Winchester, S. Hants," in which case it would be the same as Pierce's Owslebury record, or else " near Whitchurch, N. Hants."
672/2. Add to *C.F.*, S. Hants, v.-c. 11; omitted although marked * here.
674/1. For Syringe read Synge.
p. 372. 703/1. Not given in *T.B.* and *Supps.* for S. Hants, v.-c. 11.
707/1. For N. Wilts read S. Hants; correctly given in *C.F.*
p. 373. 722/2. Add this hybrid to *List*.
733/1. Not given in *T.B.* and *Supps.* for S.E. Yorks, v.-c. 61.
737/11. Add * N.C.R. for N. Lincs, v.-c. 54.
p. 374. 737/24. For *rutilis* read *rutilus*.
737/25. For 62 ? in *C.F.* substitute 63.
740/2. Delete *, vide *T.B.*, p. 425, but add to *C.F.*, Anglesey, v.-c. 52.
744/1. For " Mideford " read " Mudeford."
746/2. For " Bemridge " read " Bembridge " and for " Isles " read " Island."
p. 375. 746/10. Not given in *T.B.* and *Supps.* for Glamorgan, v.-c. 41.
p. 376. 756/2. Add * N.C.R. for S. Wilts, v.-c. 8.
p. 377. 782/5. This calls attention to a misprint in *Br. Pl. List*, p. 126, where for 782/5 *littoralis* Trin. read *linearis* Trin.
795/2. Add * N.C.R. for Durham, v.-c. 66
pp. 377 and 378. 808/1. Add * N.C.R. for Anglesey, v.-c. 52.
p. 378. 809/3. Add * N.C.R. for N. Wilts. v.-c. 7, and N. Lincs, v.-c. 54 (cf. *Rep. B.E.C.*, 1931, p. 677).

825/7. Not given in *T.B.* and *Supps.* for Glamorgan, v.-c. 41.

p. 379. 827/21. Not given in *T.B. Supp. II* for W. Gloster, v.-c. 34.

876/16. For L. read Desv.

C.F. stops at 876/15, both 876/16 and 876/17 being omitted.

p. 380 et seq. "Notes on Potamogeton by W. H. Pearsall." This paper includes on pp. 413-5 an amended list of the British forms put forward in place of that printed in the *London Catalogue.* It is suggested that the *Br. Pl. List*, from which it varies in several particulars, should now be corrected to agree with this arrangement. For the generic number 462 read 737, for the specific number 1944 read 1 and so on.

p. 386. Line 44. For *cancellata* read *cancellatus* here and on p. 413 Fryer used the words "*forma cancellata.*" The correct trivial for a var. is *cancellatus.*

pp. 421 and 422. "Notes on Mentha" appeared exactly as printed here in *Rep. B.E.C.*, 1929, pp. 201 and 202.

p. 427. *R. largificus* W. Wats. is 185/109 in the *List*, where the name is incorrectly spelt *largicus.*

p. 445. Line 8. For Northants read North Hants.

p. 450. Line 17. For f. *major* read F. Major (not in italics), being the name of the authority, vide loc. cit., p. 449, line 38.

p. 457. *agrestis* (88/22). Add * N.C.R. for S. Lincs, v.-c. 53.

pp. 457 and 458. *obtusifolia* (88/24). Add * N.C.R. for S. Devon, v.-c. 3 (Coffinswell); Hertford, v.-c. 20; and Mid Perth, v.-c. 88.

p. 458. *Deseglisei* (88/28). Add * N.C.R. for Cambridge, v.-c. 29, and Man, v.-c. 71.

latifolia (88/25). Add * N.C.R. for Pembroke, v.-c. 45.

p. 459. *ruralis* (88/26). Add * N.C.R. for S. Lincs, v.-c. 53.

contempta (88/14). Add * N.C.R. for Stafford, v.-c. 39, and Selkirk, v.-c. 79.

Lloydii (88/20). Add * N.C.R. for E. Cornwall, v.-c. 2; Denbigh, v.-c. 50; S.W. Yorks, v.-c. 63; W. Sutherland, v.-c. 108.

pp. 459 and 460. *variata* (88/15). Add * N.C.R. for S. Devon, v.-c. 3, and Worcester, v.-c. 37.

p. 460. *lepida* (88/31). Add * N.C.R. for Man, v.-c. 71, and Stirling, v.-c. 86.

Pesneaui (88/35). Add * N.C.R. for Pembroke, v.-c. 45.

p. 472. "The British forms of *Ranunculus acer* L.," by Dr E. Drabble, adds no names to those given in the *List* but alters the status of several. For the varieties appearing in the *List* under 6/3, should be substituted the arrangement of the forms given on p. 477.

p. 477. Last line. For *Narthorstii* read *Nathorstii.*

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p. 552. 21/2(2). Add to *List*.
39/5. Add var. *exigua* to *List* as var. c.
44/2. Add var. *Fraseri* to *List* as var. n(2). Var. *obconica* here referred to as allied is placed between *pyrenaica* and *hirtella* in *Rep. B.E.C.*, 1929, p. 186. It appears therefore that *Fraseri* should follow var. n. *pyrenaica*.
52/2. Add var. *brachycarpa* to *List* as var. b.
p. 553. 54/2. Add var. *syntomocarpa* to *List* as var. c.
54/14. Add var. *media* to *List* as var. c.
54/15. Add var. *phaeosperma* to *List* as var. b.
55/2. Add var. *intermedia* to *List* as var. c.
56/2. Add var. *eriocarpa* to *List* as var. c.
59/25(2) and 61/27(2). Add to *List*.
76/3. Add var. *venosum* to *List* as var. c.
88/13(3). Add to *List*.
p. 554. 96/20(2). Add to *List*.
100/5. Add var. *pratense* to *List* as var. l.
117/2. Add var. *caerulescens* to *List* as var. f.
For 132/11 read 132/12. 132/11 is preoccupied by *tetraphylla*, vide *Rep. B.E.C.*, 1928, pp. 611 and 879.
147/3(2). Add to *List*.
p. 555. 176/9. Add var. *glabrescens* to *List* as var. e.
p. 556. 196/1. Add this hybrid to *List*.
p. 558. 301/1. Add var. *dentatifolia* to *List* as var. c.
p. 559. 419/1. Add var. *angustius* to *List* as var. k.
Add var. *hirsutum* to *List* as var. l.
419/13(2) and 419/14(2). Add to *List*.
p. 560. 419/16(2). Add to *List*.
419/95(2). Add to *List* with var. *bifolium* as var. b.
419/95(3). Add to *List*.
For 419/124 read 419/124(2) and add to *List* in square brackets with var. *plurifolium* as var. b. and var. *grossidens* as var. c.
419/126. Add var. *calvescens* to *List* as var. b.
p. 561. 419/145. Delete ? in *List*.
419/184(7) and 419/184(8) are incorrectly numbered. If listed as species they should be numbered 419/184(2) and 184(3), or if listed as varieties they would be 419/184 vars. g. and h.
419/197(2). Add to *List*.
419/207. Add var. *polyphyllum* to *List* as var. b.
419/229(2). Add to *List*.
419/241. Add var. *trachyphyes* to *List* as var. m.
419/245(2). Add to *List*.
p. 562. 419/256(2). Add to *List* in square brackets with var. *radnoricum* as var. b.

423/43(2). Add to *List*.

For 423/54(2) read 423/54(4) and add to *List*. 54(2) is *duplidentifrons*, vide *Rep. B.E.C.*, 1928, pp. 624 and 880, and 54(3) is *eximium*, vide *Rep. B.E.C.*, 1929, p. 27.

For 423/65(2) read 423/65(3) and add to *List*. 65(2) is *lacerabile*, vide *Rep. B.E.C.*, 1929, p. 27.

p. 563. For 423/77(2) read 423/77(3) and add to *List*. 77(2) is *pectinatiforme*, vide *Rep. B.E.C.*, 1929, p. 28.

For 423/77(3) read 423/77(4) and add to *List*.

423/80(2). Add to *List*.

p. 564. 423/82(2). Add to *List*.

For 423/82(4) read 423/82(3) and add to *List*.

p. 565. 423/85(2) and 423/92(2). Add to *List*.

p. 566. Line 7. Add var. *latius* to *List* as var. b. of 423/92(2).

p. 567. 435/5. Add var. *fissa* to *List* as var. h.

p. 568. 435/5. Add var. *linearifolia* to *List* as var. i.

For 529/4 read 529/5. 529/4 is *C. Sinclairia*, vide *Rep. B.E.C.*, 1930, p. 276.

p. 570. 543/40. Add to *List*.

561/10. For *Rep. B.E.C.*, 278, 1931, read 1930.

600/1. Add var. *rigidulum* to *List* as var. h.

p. 571. For 600/28(2) read 600/34(2), vide *Rep. B.E.C.*, 1928, p. 882.

631(2). Add this genus to *List* with species 631(2)/1.

702/13(2), 704/2, and 717/4. Add to *List*.

p. 572. 746/3. Add var. *fluitans* to *List* as var. b. of *S. lacustris* and add var. *capitatus* to *List* as var. b. of 746/4 *S. Tabernaemontani*. Correct × *arunensis* Dr. in *List* to read ×*Scheuchzeri* Brügger.

746/3. For *Scheonoplectus* read *Schoenoplectus*.

747/2. Correct name of authority in *Pl. List* to Honckeny.

p. 573. 844/6. Add var. *simulans* to *List* as var. f.

868/1. In fourth line of paragraph, read Lewes for Lewis.

p. 632. 3/9. Add to *List*.

p. 633. 6/27. Add * N.C.R. for N. Somerset, v.-c. 6.

6/31. Add * N.C.R. for N.E. Yorks, v.-c. 62.

p. 634. 13/3. Not given in *C.F.* for S. Devon, v.-c. 3.

21/10. Add †.

36/5. Not given in *T.B.* and *Supps.* for Glamorgan, v.-c. 41.

p. 635. 43/4. Not given in *T.B.* and *Supps.* for Oxford, v.-c. 23.

44/1. Add * N.C.R. for Dorset, v.-c. 9, and Anglesey, v.-c. 52.

44/2. Add * N.C.R. for W. Cornwall, v.-c. 1; Dorset, v.-c. 9; Rutland, v.-c. 55; N.W. Yorks (Ingleborough), v.-c. 64; and Cumberland, v.-c. 70.

44/2. Add var. *linearifolia* to *List* as var. b(2).

pp. 635 and 636. 44/3. Add * N.C.R. for Rutland, v.-c. 55.

47/2. Add †.

p. 636. 49/3. Add †.
49/4. Add †.
54/1. Add to *C.F.* for Oxford, v.-c. 23, in brackets.
54/2. Add var. *auriculata* to *List* as var. d.
54/20. Add to *C.F.* for M.W. Yorks, v.-c. 64, in brackets.
54/22. Add †.
p. 637. 61/3. Add * N.C.R. for W. Cornwall, v.-c. 1.
p. 638. 88/6. *V. canina* is not recorded for Orkney, v.-c. 111. Needs confirmation.
88/24. Read 88/25; the * applies to Bucks, v.-c. 24, only.
88/36. An addition to the *List*, the garden Pansy, but hardly deserving the * !.
96/6. Add * N.C.R. for Warwick, v.-c. 38, but in brackets.
p. 639. 100/1. Add to *C.F.*, Pembroke, v.-c. 45.
103/2. Add to *C.F.*, Orkney, v.-c. 111.
104/1. The segregate is not given in *T.B. Supp. II* for W. Cornwall, v.-c. 1.
110/1. Add †.
115/2. Add * N.C.R. for Stafford, v.-c. 39, but in brackets.
For 117/8 read 117/9.
p. 640. 127/2. Add to *C.F.*, Pembroke, v.-c. 45.
128/3. For *Cicutarium* read *cicutarium*.
153/1. Delete *, and for *falcata* read *Falcata*.
153/4. Not given in *T.B.* and *Supps.* for Warwick, v.-c. 38, Stafford, v.-c. 39.
p. 641. 155/37. For *parviflora* read *parviflorum*.
176/3. Add var. *elegans* to *List* as var. g.
178/3. Add to *C.F.*, W. Sussex, v.-c. 13.
183/2 and 184/5. Add †.
p. 644. For 185/45(3) read 185/45(2), vide *Rep. B.E.C.*, 1930, p. 260.
185/53(2). Add to *List*.
p. 645. 185/59(2). Add to *List*.
185/71. Delete " new to Ireland." List gives H 1.
p. 646. 185/83(3). Add to *List*.
p. 648. For 185/100(2) read 185/109(2), vide *Br. Pl. List*, p. 33.
185/104(2). Add to *List*.
For 185/109(2) read 185/109(4), vide *Rep. B.E.C.*, 1930, p. 262, as corrected above.
p. 649. For 185/111 read 185/112.
p. 650. 185/151. Add hybrid ×*polyanthemus* to *List*.
185/153. Add hybrid ×*cryptadenes* to *List*.
187/2. Add to *C.F.*, Pembroke, v.-c. 45.
p. 651. 194/19. Add to *C.F.*, under aggregate *tomentosa*, N. Wilts, v.-c. 7, but *T.B. Supp. I*, p. 33, gives "all except 102."
195/13. Add * N.C.R. for Easterness, v.-c. 96.
199/24. Add †.
211/4. Add to *C.F.*, N. Devon, v.-c. 4.
213/1. Add to ×*obovata* in *C.F.*, S. Hants, v.-c. 11.

p. 652. 219/2. Not given in *T.B.* and *Supps.* for Bucks, v.-c. 24.
220/6. Not given in *T.B.* and *Supps.* for Bucks, v.-c. 24.
p. 653. 283/2. Delete * and " new to v.-c. 64." Add to *C.F.*, M.W. Yorks, v.-c. 64, but see *T.B.*, p. 203.
283/8. Not given in *T.B.* and *Supps.* for Orkney, v.-c. 111.
287/3. Not given in *T.B.* and *Supps.* for E. Cornwall, v.-c. 2.
296/8. Add * N.C.R. for S. Devon, v.-c. 3.
306/3. Add †.
p. 654. 341/3. Add †.
351/4. Not given in *T.B.* and *Supps.* for S. Hants, v.-c. 11.
365/7. Add †.
368/1. Add * N.C.R. for W. Sussex, v.-c. 13.
370/8. Add †.
370/15. Add †.
371/3. Add * N.C.R. for Orkney, v.-c. 111, and cf. p. 733, *loc. cit.*
378/7. Add †.
378/15. Add †.
378/16. Add †.
378/18. Add †.
383/26. Add †.
395/3. Add †.
p. 655. 396/5. Add to *C.F.*, Pembroke, v.-c. 45.
405/8. Add to *C.F.*, N. Wilts, v.-c. 7.
405/12. Add * N.C.R. for Orkney, v.-c. 111.
p. 655. 406/1. Add †.
407/1. Add †.
p. 656. 419/122. Add var. *apiculatum* to *List* as var. b. The name appears in the *List* following 419/123 *megapodium* D., but it is not clear whether it is intended to be a synonym or variety of that species, as it is neither in brackets nor in black print.
p. 658. For 423/84(2) read 423/84(6), vide *Rep. B.E.C.*, 1928, p. 881.
425/2. Delete *, recorded for Leicester, v.-c. 55, in *Rep. B.E.C.*, 1930, p. 360, and see correction above.
p. 659. 453/3. Add to *C.F.*, Flint, v.-c. 51.
p. 660. 474/2. For *Davidi* read *Davidii*.
478/1. For Fishburn read Fishbourne.
pp. 660 and 661. 506/1. Under *strigulosa*. The species is bracketed in *T.B.* for Shetland, v.-c. 112, but is given in *C.F.*
Under *nemoralis*. For *nemoralis* read *memor*. Add to *C.F.* for Easterness, v.-c. 96, but not N.C.R., vide *T.B. Supp. I*, p. 65.
Under *Reichenbachiana*. Not given in *T.B.* and *Supps.* for W. Ross, v.-c. 105, but given in *C.F.*
p. 661. 506/8. Add var. *dumetorum* to *List* as var. d.
527/7. Delete *, given in *C.F.* and in *T.B.* in brackets.
532/1. For Mill. read (L.) Karst.

535/1. Mr Pierce's and Mrs (not Miss) Sidebottom's stations for this plant are the same. The * applies to S. Hants, v.-c. 11, only, and not to Berks, v.-c. 22.

p. 662. 542/1. Add †.

For 543/8 (*scutellata*) read 543/6.

546/4. Add to *C.F.*, Pembroke, v.-c. 45, and Derby, v.-c. 57.

545/5. Not given in *T.B. Supp. II* for Orkney, v.-c. 111.

545/15. Not given in *T.B. Supp. II* for Orkney, v.-c. 111.

545/19. Not given in *T.B. Supp. II* for E. Kent, v.-c. 15.

545/22. Add * N.C.R. for S. Devon, v.-c. 3, but included in *C.F.*

548/5. Not given in *T.B. Supp. II* for Orkney, v.-c. 111.

p. 663. 552/5. Not given in *T.B.* and *Supps.* for Bucks, v.-c. 24.

553/4. Add to *C.F.*, Pembroke, v.-c. 45.

558/3. Included in *M. longifolia* in *C.F.* and given for Orkney, v.-c. 111, but not so given in *T.B.* and *Supps.* where it is included in *M. sylvestris*.

558/12. Not given in *T.B. Supp. II* for Bucks, v.-c. 24.

561/1. Not given in *T.B. Supp. II* for Surrey, v.-c. 17, under *T. ovatus*.

p. 664. 561/10. Add to *C.F.*, W. Gloster, v.-c., 34.

561/11. Add to *C.F.*, S. Lancs, v.-c. 59.

574/1. Add to *C.F.*, Pembroke, v.-c. 45, but *T.B.* gives this in brackets.

577/3. Add var. *umbrosa* to *List* as var. d., if valid.

For 577/2 read 577/4.

For 581/1 read 581/3.

p. 665. 586/4. Add to *C.F.*, E. Kent, v.-c. 15.

588/3 and 588/4. Some of these references are very confusing. It is not clear, for instance, whether var. *laciniata* (Willk.) Pilger should appear in the *List* as additional to or in substitution of var. *ceratophyllon* Rapin. In the first paragraph *laciniata* is made synonymous with *ceratophylla* (sic), but in the fifth paragraph Dr Pilger appears to have named some of the plants submitted to him *ceratophyllon* in distinction to *laciniata*.

It appears that 588/4 *P. Sabrinae* (Bak. & Card.) Druce should disappear from the *List* as a species and be listed under 588/3 as var. *Columnae* (Gouan) Willd., in which case it will be var. k. (If it is retained as a species, it will have *latiloba* (Pilger pro sub-var.) as var. b.).

588/3. Add var. *stricta* to *List* as var. l.

p. 666. 588/9. Var. *Urvilleana* Rapin will supplant var. *lanceolatiformis* in the *List* as var. b.

600/13. Not given in *T.B.* and *Supps.* for Herts, v.-c. 20.

600/15. Add to *C.F.*, M.W. Yorks, v.-c. 64, but given in *T.B.* in brackets.

p. 667. 628/9. Add to *C.F.*, N. Wilts, v.-c. 7.

628/11. Add * N.C.R. for W. Sutherland, v.-c. 108; not given in *T.B. Supp. II* for S. Hants, v.-c. 11; Oxford, v.-c. 23; and S. Lancs, v.-c. 59.

633/1. Add * N.C.R. for Orkney, v.-c. 111.

p. 668. 651/3. Add to *C.F.*, E. Ross, v.-c. 106.

659/1. Add * N.C.R. for Orkney, v.-c. 111, cf. p. 733 loc. cit. included in *C.F.*

668/2. Add to *C.F.*, Pembroke, v.-c. 45.

p. 669. 668/5. Add to *C.F.*, Glamorgan, v.-c. 41.

669/7. Not given in *T.B.* and *Supps.* for Leicester, v.-c. 55, or N.W. Yorks, v.-c. 65.

669/8. For "E. Yorks" read "S.E. Yorks" and add * N.C.R. for v.-c. 61; for "Birlby Common, Somerset," read "Britty Common, S. Somerset," and add * N.C.R. for v.-c. 5.

669/9. For Yorks read M.W. Yorks, v.-c. 64, and add to *C.F.*, cf. p. 725 loc. cit.

669/10. Add to *C.F.*, Notts, v.-c. 56.

p. 670. 669/12. Add to *C.F.*, Notts, v.-c. 56, and Argyll, v.-c. 98.

669/18. Not given in *T.B.* and *Supps.* for Herts, v.-c. 20; Bucks, v.-c. 24; or Rutland, v.-c. 55.

676/2. Add * N.C.R. for Pembroke, v.-c. 45.

680/1. Add †; the * applies only to the record for S. Hants, v.-c. 11.

686/1. Add to *C.F.*, N.C.R. for M.W. Yorks, v.-c. 64, not v.-c. 6 as printed.

p. 671. 702/7. Add † and add to *C.F.*, S. Hants, v.-c. 11.

718/14. Add to *C.F.*, Mid Ebudes, v.-c. 103.

718/16. Add †; not given in *T.B. Supps.* for Bucks, v.-c. 24.

723/1. For E. read W. Sussex.

p. 672. 731/1. Add * N.C.R. for Pembroke, v.-c. 45.

737/11. Var. *subgramineus* does not appear in the *List* as printed but is var. b. in the corrected list, vide *Rep. B.E.C.*, 1930, p. 414 and note above.

p. 673. 744/1. Add * N.C.R. for Hereford, v.-c. 36, but in brackets.

746/2. Delete *. It is, of course, only the variety which is said to be new to Surrey.

p. 674. 753/15. Var. *alpina* Drej. = *C. Sadleri* Lint. = 753/16, to which add * N.C.R. for Easterness, v.-c. 96, with ? and for W. Ross, v.-c. 105. But (teste Kükenthal) *Sadleri* should disappear from the *List* as a species.

p. 675. 753/21. Not given in *T.B.* and *Supps.* for N.W. Yorks, v.-c. 65, and Durham, v.-c. 66; add * N.C.R. if N. Essex, v.-c. 19.

753/22. Add * N.C.R. for E. Sussex, v.-c. 14; not given in *T.B.* and *Supps.* for Hebrides, v.-c. 110

p. 676. 753/63. × *Boenninghausiana.* Add * N.C.R. for Surrey, v.-c. 17.

765/7. Add †.

767/1. Add * N.C.R. for Renfrew, v.-c. 76, but included in *C.F.*

770/4. Add to *C.F.*, W. Sutherland, v.-c. 108, and Caithness, v.-c. 109.

p. 677. 785/1. Not given in *T.B.* and *Supps.* for Oxford, v.-c. 23.

791/1. The *List* gives the authority for var. *parviflora* as (Thuill.) Dum.

793/4. Add †, and for (L.) read (Lam.).

809/3. Delete * for N. Wilts and N. Lincs, vide *Rep. B.E.C.*, 1930, p. 378, and correction above. Add Anglesey, v.-c. 52, to *C.F.*

824/1. Add †; not given in *T.B. Supp. II* for N. Hants, v.-c. 12.

824/5. Add †; not given in *T.B. Supp. II* for Surrey, v.-c. 17.

p. 678. 825/1. For *Glygeria* read *Glyceria.*

825/3. Not given in *T.B. Supp. II*, under the segregate *declinata* for Berks, v.-c. 22.

825/4. Add to *C.F.*, Mid Ebudes, v.-c. 103.

825/8. Add to *C.F.*, *N. Lincs*, v.-c. 54.

826/3. Not given in *T.B.* and *Supps.* for Glamorgan, v.-c. 41.

826/14. Add †; note that in *C.F.* *F. sulcata* Hack. appears as 826/14, whereas in the *List* it is placed as var. e. of 826/9 *F. ovina.*

826/16. Add to *C.F.*, N. Devon, v.-c. 4.

p. 679. 827/19(2). Add * N.C.R. for E. Sussex, v.-c. 14.

827/22, 827/27, 832/12, 835/12. Add †.

p. 695 et seq. The paper, "Roses in Angus," by Mrs Corstorphine, makes it necessary to add Angus, v.-c. 90, to the following aggregates in *C.F.*, viz.:—

194/6. *canina*, p. 699, as *lutetiana*, *sphaerica*, etc.

194/7. *squarrosa*, p. 700, as *viridicata*, *biserrata*, etc.

194/12. *glauca*, p. 701, etc., as *glaucophylla*, *coriifolia*, etc.

p. 714. Line 34. For *adscendens* read *ascendens*, cf. *Br. Pl. List*, 318/18 and the Key on p. 712.

p. 719 et seq. The paper, "Some Planted or Cultivated Willows," by J. Fraser, necessitates the following additions to the *List*, viz.:—

p. 719. 650/3. Add var. *stenophylla* as var d.

p. 720. 650/3. Add var. *britzensis* as var. e.

Add ×*babylonica*=*sepulchralis* Simonkai.

p. 721. Add var. c. (*vitellina*)×*babylonica*=*chrysocoma* Dode.

650/20. Add ×*fragilis*=*blanda* Anderss.

p. 723. 650/5. Add var. *Eugenei* as var, d,

p. 724. Add to *List* under 668/2, ×*purpurata*=*Schulzei* (Fournier).

p. 725. *O. praetermissa* (669/8). Mr Day states that Mathon though formerly in Worcester is now in Hereford. This species is well known however elsewhere in Worcester, as at Leigh for instance, so that the record for Worcester may stand. It is also known elsewhere in Hereford, notably near Sollers Hope Church. Thus both v.-c.s 36 and 37 should be added to *C.F.*, but the former is already given in *T.B. Supp. II.*

O. purpurella (669/9), cf. p. 669, *loc. cit.*

O. maculata (669/10). Delete *, not N.C.R. for v.-c. 64, vide *Rep. B.E.C.*, 1930, p. 370, and correction above for that p.

O. Fuchsii (669/11). Add to *C.F.*, M.W. Yorks, v.-c. 64.

p. 729. Add *H. sagittaticeps* to *List* as 419/110(2).

Add *H. Sinclairii* to *List* as 419/119(2).

p. 730. Add *H. paraliaeforme* to *List* as 419/145(2).

p. 731. Add *H. Johnstonii* to *List* as 419/238(2).

p. 733. The references are to *London Catalogue*, not to the *Br. Pl. List*, so that *V. agrestis*, var. *Garckiana* is var. b. instead of c.; and

P. vulgaris, var. *nemoralis* is var. b. instead of c.

p. 735. *C. Vitalba* (1/1). Add var. *crenata* (Jord.) to *List*, as var c.; and add var. *Timbali* Drabble to *List* as var. d.

p. 737. *N. sylvestre* (35/2). Add * N.C.R. for Wight, v.-c. 10.

L. ruderale (61/4). Add to *C.F.*, Wight, v.-c. 10, but previously recorded in Rayner's *Supplement* to *Flora of Hants.*

L. Draba (61/3). Add to *C.F.*, Wight, v.-c. 10, previously recorded in Townsend's *Flora of Hants* and Rayner's *Supplement.*

p. 738. *V. Lejeunei* (88/19). Add * N.C.R. for Wight, v.-c. 10.

V. derelicta (88/30). Add * N.C.R. for Wight, v.-c. 10.

p. 739. *L. alba* (98/3). Add var. *colorata* to *List* as var. b.

C. tetrandrum (100/9). Add var. *luxurians* to *List* as var. h.

S. media (101/3). Add var. *major* to *List* as var. d.

p. 740. *A. serpyllifolia* (102/5). Add var. *sphaerocarpa* to *List* as var. g.

S. apetala (103/8). Add var. *barbata* to *List* as var. d.

S. Reuteri (103/9). Add * N.C.R. for Wight, v.-c. 10.

p. 741. Line 12. For *Lavatera* read *Althaea.*

G. Robertianum (127/14). Add var. *rubricaule* to *List* as var. f.

M. Falcata (153/1). Add * N.C.R. for Wight, v.-c. 10, in brackets.

M. silvestris (153/2). Add * N.C.R. for Wight, v.-c. 10, in brackets.

p. 743. *L. Aphaca* (178/9). Add * N.C.R. for Wight, v.-c. 10.

L. latifolius (178/1). Add * N.C.R. for Wight, v.-c. 10.

L. tuberosus (178/3). Add * N.C.R. for Wight, v.-c. 10.

P. polygamum (193/2). Add to *C.F.*, Wight, v.-c. 10, but see *T.B.* under *P. Sanguisorba.*

p. 744. *E. parviflorum* (220/4). Add var. *mollissimum* to *List* as var. b.

C. Carvi (250/1). Add * N.C.R. for Wight, v.-c. 10.

p. 745. *C. latifolia* (283/8). Add * N.C.R. for Wight, v.-c. 10.

E. canadense (320/3). Add * N.C.R. for Wight, v.-c. 10.

p. 746. *S. viscosus* (383/8). Add to *C.F.*, Wight, v.-c. 10; previously recorded in *T.B. Supp. II.*

p. 747. *L. Serriola* (425/2). Add to *C.F.*, Wight, v.-c. 10; previously recorded in Rayner's *Supplement.*

p. 748. *A. planifolia* (458/3). Add * N.C.R. for Wight, v.-c. 10.

A. arvensis (467/2). Add var. *lilacina* to *List* as var. d.

p. 750. *E. brevipila* (345/3). Not given in *T.B. Supp. II* for Wight, v.-c. 10.

U. neglecta (552/2). Add to *C.F.*, Wight, v.-c. 10; previously recorded in Rayner's *Supplement.*

M. longifolia (558/3). Add to *C.F.*, Wight, v.-c. 10; bracketed in *T.B.* and *C.F.*

p. 751. *G. Tetrahit* (578/2). Add var. *arvensis* to *List* as var. e.

L. purpureum (581/3). Add var. *decipiens* to *List* as var. d.

p. 752. *A. glabriuscula* (606/7). Add var. *pseudocalotheca* to *List* as var. d.

p. 753. *E. virgata* (628/9). Add * N.C.R. for Wight, v.-c. 10.

p. 754. *N. biflorus* (684/3). Add to *C.F.*, Wight, v.-c. 10; previously recorded in *Fl. of Hants*; and correct number in *C.F.* from 684/2.

G. nivalis (685/1). Add to *C.F.*, Wight, v.-c. 10; previously recorded in *Fl. of Hants.*

p. 755. *J. acutiflorus* (718/9). Add hybrid × *subnodulosus* to *List.*

p. 756. *P. lineare* (754/11). Add * N.C.R. for Wight, v.-c. 10.

P. sanguinale (754/10). Add to *C.F.*, Wight, v.-c. 10; previously recorded in Rayner's *Supplement.*

P. Crus-galli (754/8). Add to *C.F.*, Wight, v.-c. 10; previously recorded in Rayner's *Supplement.*

P. minor (765/1). Add * N.C.R. for Wight, v.-c. 10.

A. aristatum (766/2). Add to *C.F.*, Wight, v.-c. 10; previously recorded in Rayner's *Supplement.*

C. Dactylon (797/1). Add to *C.F.*, Wight, v.-c. 10 (in brackets); previously recorded in Rayner's *Supplement.*

p. 757. *C. echinatus* (808/1). Add to *C.F.*, Wight, v.-c. 10; previously recorded in Rayner's *Supplement.*

F. ambigua (826/16 b). Add to *C.F.*, Wight, v.-c. 10; previously recorded in Rayner's *Supplement,*

B. madritensis (827/5). Add * N.C.R. for Wight, v.-c. 10.
B. maximus (827/1). Add * N.C.R. for Wight, v.-c. 10.
L. remotum (829/3). Add * N.C.R. for Wight, v.-c. 10.

p. 759. Add genus *Physostegia* to *List* as 573(2).
Add *P. virginiana* Benth. to *List* as 573(2)/1.
Add *Amaranthus viridis* auct. to *List* as 596/15.

p. 764. *R. hirtior* W. Wats. should be numbered 185/68(2) in the *List*.

p. 766. *R. rhombophyllus* M. & L. should be numbered 185/111(3) in the *List*.

p. 767. *R. aspericaulis* L. & M. should be numbered 185/90(2) in the *List*, and placed in brackets, with var. *cantianus* W. Wats. as var. b.

p. 769 et seq. Dr Lindquist's paper necessitates the following changes in the *List*:—
718/11. Name will revert to *J. alpinus* Villars.
With var. *rariflorus* (Fr.) Hartman as var. b. (=*nodulosus* Wahl.), and var. *Marshallii* (Pugsl.) Lindquist as var. c.

p. 779 and 781. The distribution of 718/11, as far as at present ascertained, should be corrected in *C.F.* to read 66, 73, 88, 89, 96, 98, 106.

p. 816. Line 12. P. 144, line 1 from bottom of page should apparently read P. 136.

REP. B.E.C., 1931, VOL. IX, PART VI.

p. 829. *Prangos Uechtritzii* Boiss. et Haussk., cf. *Rep. B.E.C.*, 1930, p. 354.
Add to *List* the genus *Prangos*, as 263(2), with *P. Uechtritzii* Boiss. et Haussk. as 263(2)/1.

p. 843. Line 33. For Anstwick read Austwick.

NOTES FROM THE JOURNAL OF BOTANY, 1926-1931.

PATRICK M. HALL.

In the course of checking up some references in connection with the previous paper "Corrections and Additions," it became apparent that though many of the new species, varieties, etc., added to the British Flora in the *Journal of Botany* and other periodicals had been referred to in the Reports of the Society and so found their way into the *British Plant List*, yet a considerable number had been passed over. Further, there are new county records made in these periodicals which have not found their way into the *Comital Flora* through the *B.E C. Reports.*

To attain the object defined in the previous paper, it appears to be desirable that all authentic additions, changes of nomenclature, and new records should be collated from the various publications affecting British Botany. With that object in view, a start has been made by collecting from the *Journal of Botany* all such additions, etc., for the years 1926-1931 inclusive, with the results given below. All additions and new records during this period, which have already been noticed in the *B.E.C. Reports*, are omitted here. Additions and new records published in the *Journal of Botany* during 1932 have been included in "Plant Notes" and "New County Records" respectively in this *Report.*

The collection of additions and new records from the other publications bearing upon British Botany is clearly a matter which will entail wide reading and research and could not be attempted in time for publication in this *Report.*

The year 1926 has been selected as a convenient starting point in this and the previous paper for the reason that the Second Supplement of *Top. Botany* included all the available information on county records up to the end of the year 1925.

All citations below are from the *Journal of Botany* unless it is specifically stated otherwise.

A.—ADDITIONS AND CORRECTIONS TO "BRITISH PLANT LIST."

35/. The source of the generic name *Rorippa*, by Dr T. A. Sprague, lxviii, 219, 1930. The name *Radicula* Hill (1756) is rejected because it coincides with a technical term currently used in morphology, and was unaccompanied by a specific name. The alternative name, *Nasturtium* R. Br. (1812), is conserved for the monotypic genus based on the Water Cress, but becomes subject to the Rules of Priority when that genus is made to embrace the Yellow Cresses. Dr Sprague therefore proposes the adoption of the name *Rorippa* Scop. (1760).

55/1 b. ✠*Diplotaxis tenuifolia* DC., var. b. *integrifolia* Koch (Syn. Fl. Germ. et Helv., i, 57, 1836). Leaves almost entire or coarsely and irregularly toothed, and other slight differences from the type. Recorded by C. E. Salmon, lxvi, 204, 1928, from Pegwell Bay, E. Kent, v.-c. 15.

55/2 b. *D. muralis* DC., var. *caulescens* Kittel replaces the name *Babingtonii* (Syme). C. E. Salmon, *l.c.*

88/35. *Viola Mackaii* H. C. Wats. Cyb. Brit., 487 (1870), replaces the name *Pesneaui* Lloyd & Fouc. (1886). Dr E. Drabble, lxviii, 141, 1930. *Pesneaui* L. & F. and *Curtisii* Forst. both appear in the *Plant List* as species, but Dr Drabble treats them both as maritime forms of *lutea*, one with particoloured and the other with yellow flowers.

96/10 b. *Silene dubia* Herbich., lxix, 288, 1931, H. W. Pugsley in Rep. Wats. B.E.C. (1930-31). This name should not appear in the *List*: the plant which has been identified as *dubia* is the true *S. nutans* L. The broad-leaved white-flowered endemic, var. *Smithiana* Moss, should appear in the *List* as 96/10 b.

102/5 a. ✠*Arenaria serpyllifolia* L., var. a. *scabra* Fenzl apud Ledeb. Fl. Ross., i, 369 (1842). Tota planta minutissime eglandulosa scabra vel hirta. Drabble, lxviii, 370, 1930.

102/6 e. ✠*A. leptoclados* Guss., var. e. *petiolata* Drabble, *l.c.* A well-marked eglandular variety, with large, elliptical leaves, ending abruptly in a shortly acuminate-cuspidate apex and narrowed below into a winged base or petiole from one-third to two-thirds the length of the lamina. Stems diffuse, procumbent. Freshwater, Isle of Wight.

127/6. *Geranium Endressii* J. Gay. The Cornish plants belong to the
✠var. b. *Endressii* Knuth, forma *luxurians*, and
✠var. c. *Thurstoniana*, var. nov. W. B. Turrill, lxvi, 44, 1928.

167/1 b. *Oxytropis* [*Halleri* Bunge], var. b. *appresso-sericea* Bercherer should replace the name *O. sericea* (Lam.) Simonk. in the *Plant List*. A. Bercherer, lxvi, 293, 1928.

185/19(2). ✠*Rubus cissburiensis* W. C. Barton and H. J. Riddelsdell. lxix, 238, 1931. Related to *R. argenteus* Wh. & N., forma *glandulosus* and *R. Gelertii* Frider = *R. alterniflorus* M. & L., see W. Watson. Recorded from v.-c.s 7, 12-17.

185/43(2). ✠*R. Brittonii* Bart. & Ridd., lxix, 191, 1931. Related to *R. ramosus* Briggs. Surrey, Middlesex and Berkshire.

185/68. *R. hirsutissimus* Sudre, not of Sudre & Ley. Riddelsdell, lxviii, 250, 1930.

185/106 c. *R. sagittarius* Ridd., lxviii, 24, 1930, is suggested in place of *R. mutabilis* Genev., var. *nemorosus* Genev.

187/2. ×*Geum intermedium*. According to E. M. Marsden Jones and W. B. Turrill, lxviii, 88, 1930, if this name is applied to the F_1 hybrid, it should be quoted as of Willdenow and not Ehrhart.

190/. *A Revision of the British Roses*, by Lt.-Col. A. H. Wolley-Dod, published as Supplement to *J.B.*, 1930-31. This important Monograph by the Society's referee for *Rosa* involves practically a complete change in the arrangements of the *List*, for full details of which the reader is referred to the paper itself. The changes in the order of the species and varieties, the amalgamation of two or more varieties under one name and similar changes will not be dealt with here: all that is attempted in this Note is to indicate those names which are new to the *List*, either as definite additions or owing to changes in nomenclature. The numbers used below are those of the existing *List*, not of the Revision.

194/2. *Rosa arvensis* L.
Add var. a. *vulgaris* Ser. in place of var. c. *scabra* Baker, which is dropped. *Supp.*, p. 5.
Add under var. a. ✠forma *baldensis* (Kern.) J. B. von Keller, *l.c.*, p. 5.
Add var. h. *gallicoides* (Déségl.) Crép., as variety instead of hybrid, *l.c.*, p. 5.
For ×*arvina* W.-Dod read ×*Wheldoni* W.-Dod, *l.c.*, p. 6.

194/5. *R. stylosa* Desv.
Add ✠var. e. (2) *cristata* W.-Dod, *l.c.*, p. 102.
delete < before j. *chlorantha* (Sauz. & Maill.).

194/6. *R. canina* L.
Delete var. b. *fallens* (Déségl.), *l.c.*, p. 26.
Under var. a. add ✠forma *lasiostylis* Borb., *l.c.*, p. 27.
Var. l. read *spuria* (Pug.) W.-Dod, *l.c.*, p. 29.

194/7. *R. squarrosa* Rau. This species and its varieties are placed under *R. canina* as Group III, Dumales.
Var. h. for *virdicata* read *viridicata*.
Add ✠var. k. *fraxinoides* H. Br., *l.c.*, p. 36, with forma *recognita* Rouy under it.

194/8. *R. andegavensis* (Bast.) is also treated as a group under *Canina*.
Add under var. c. ✠forma *clivicola* Rouy, *l.c.*, p. 39.
Var. k. read *Wolley-Dodii* Sudre (as form of *Pouzini*), *l.c.*, p. 41.
Delete var. ? l. *litigiosa* Crép., not referred to in the Revision.

194/9. *R. Blondaeana* (Rip.) is also treated as a group under *Canina*.
Var. d. *latebrosa* (Déségl.), delete ?, *l.c.*, p. 43.
Canina agg. hybrids. These should be printed after 149/9, not 194/10.
Delete ×*Drucei* W.-Dod, based on insufficient material, *l.c.*, p. 43.
As second parent of ×*latens* W.-Dod read *rubiginosa* (*Eglanteria* of *List*) in place of *micrantha*, *l.c.*, p. 43.
Add ✠*canina*×*rubiginosa* (*Eglanteria*) = ×*Standeni* W.-Dod, *l.c.*, p. 44.
For ×*Chasei* Dr. read ×*Praegeri* W.-Dod, *l.c.*, p. 44.

194/10. *R. dumetorum* Thuill.
Add ✠var. a. *typica* W.-Dod, *l.c.*, p. 46.
Delete var. l. *canescens* (Baker) W.-Dod transferred to 194/18 *R. obtusifolia* Desv., q.v., *l.c.*, p. 46.
Add ✠*dumetorum* × *gallica* = × *collina* Jacq., *l.c.*, p. 53.

194/11. *R. Deseglisei* (Boreau) is treated as a group under *dumetorum*.
Add ✠var. d. (2) *calvescens* W.-Dod, *l.c.*, p. 102.

194/12. The name *R. glauca* Vill. is replaced by *R. Afzeliana* Fr., *l.c.*, p. 104.
Var. e. read *glaucophylla* (Winch) W.-Dod, *l.c.*, pp. 56, 104.
Under var. e. add ✠forma *jurassica* (Rouy) W.-Dod, *l.c.*, pp. 56, 104.
Add ✠var. r. *glandulifera* (R. Kell.) W.-Dod, *l.c.*, pp. 60, 105.
Add ✠var. s. *Briqueti* (R. Kell.) W.-Dod, *l.c.*, p. 105.

194/13. *R. coriifolia* Fr. (*caesia* Sm. of *List*).
Add ✠var. a. *typica* Chr., *l.c.*, p. 61.
Add ✠var. e. (2) *bovernieriana* Chr., *l.c.*, p. 63.
Add ✠var. j. (2) *Lintoni* Scheuz., not synonymous with var. h., *l.c.*, p. 67.

194/14. *R. micrantha* Sm.
Var. b. read *typica* Chr., *l.c.*, p. 96.
Add under var. b. ✠forma *trichostyla* R. Kell., *l.c.*, p. 96.
Delete var. e. *microcarpa* R. Kell., *l.c.*, p. 98.
Delete var. g. *sylvicola* (Déségl. & Rip.), *l.c.*, p. 98.
Add ✠*micrantha* × *canina* ? = × *Toddii* W.-Dod, *l.c.*, p. 106.
Add ✠*micrantha* × *rubiginosa* (*Eglanteria*) = *dubia* W.-Dod, *l.c.*, p. 99.
Add ✠*micrantha* × *agrestis* = × *Bishopii* W.-Dod, *l.c.*, p. 99.

194/15. *R. rubiginosa* L. (*Eglanteria* L. of *List*).
Var. b. read *typica* W.-Dod, *l.c.*, p. 94.

194/16. *R. agrestis* Savi.
Add ✠var. a. *typica* R. Kell., *l.c.*, p. 101.

194/18. *R. obtusifolia* Desv.
Add ✠var. a. *typica* W.-Dod, *l.c.*, p. 70.
Var. d. read *canescens* (Baker) W.-Dod as form under var. e., *l.c.*, p. 71.
Under var. e. add ✠forma *glandulosa* Crép., *l.c.*, p. 71.
Delete var. i. *Nicholsoni* (Chr.), *l.c.*, p. 73.
Add ✠*obtusifolia* × *dumetorum* = × *concinnoides* W.-Dod, *l.c.*, p. 73.
Add ✠*obtusifolia*, var. *tomentella* × *dumetorum* = × *bickertonensis* W.-Dod, *l.c.*, p. 74.
Add ✠*obtusifolia*, var. *Borreri* × *canina* = × *surreyana* W.-Dod. *l.c.*, p. 103.

194/19. *R. tomentosa* Sm.
Add ✠var. a. *typica* W.-Dod, *l.c.*, p. 86.
Delete var. c. *confusa* (Pug.) R. & C., *l.c.*, p. 87.
Under var. d. add ✠forma *parvula* W.-Dod, *l.c.*, p. 88.

Under var. f. add ✠forma *Leesii* W.-Dod, *l.c.*, p. 90.

Var. g. *foetida* (Bast.) Ser. is divided between forms under var. f.

Forma *foetida* (Bast.) Ser.

Forma *moretonensis* W.-Dod (= *R. Jundzilliana* Baker non Bess.), *l.c.*, p. 91.

Add ✠*tomentosa* × *canina* = × *Rogersii* W.-Dod, *l.c.*, p. 92.

Add ✠*tomentosa* × *canina* ? = × *curvispina* W.-Dod, *l.c.*, p. 105.

Add ✠*tomentosa* × *dumetorum* = × *aberrans* W.-Dod, *l.c.*, p. 92.

194/20. *R. Sherardi* Davies (*omissa* Déségl. of *List*).

Var. b. read *typica* W.-Dod, *l.c.*, p. 80.

Add ✠*Sherardi*, var. *suberecta* × *tomentosa* = × *suberectiformis* W.-Dod, *l.c.*, p. 85.

Sherardi, var. *tomentosa* × *spinosissima* = × *perthensis* Rouy, vice ×*Barclayi* W.-Dod, *l.c.*, p. 22.

194/21. *R. villosa* L.

Add var. a. *pomifera* (Herrm.) Desv. = 194/22 of *List*, *l.c.*, p. 75.

Under var. a. add ✠forma *friburgensis* (Lagg. et Pug.) Chr., *l.c.*, p. 76, and ✠forma *lagenoides* Favr., *l.c.*, p. 76.

Under var. b. add ✠forma *Wildei* W.-Dod, *l.c.*, p. 77.

194/23. *R. spinosissima* L.

Add ✠var. a. *typica* W.-Dod, *l.c.*, p. 10.

194/23. *R. spinosissima* L., lxviii, 87, 1930, Prof. J. W. Heslop Harrison in *Vasculum*, February 1929, enumerates and describes the varieties of this species, including these additions to the *List*.

✠Var. j. *variegata* Harrison.

✠Var. k. *pusilla* (Woods).

✠Var. l. *dunensis* Harrison. ? var. vel hybr.

Wolley-Dod includes var. *rubra* Harrison in var. *rosea* (Koch). Var. i. *rivalis* Harrison may ultimately prove to be a hybrid.

195/5. Add ✠*Pyrus Aucuparia* × *intermedia* (*scandica*). Surrey, C. E. Salmon, *Notes on Sorbus*, lxviii, 172, 1930.

396/8. Add ✠*Cirsium arvense* × *tuberosum*. Avebury, N. Wilts, H. J. Riddelsdell, lxix, 312, 1931.

457/5(2). Add ✠*Limonium paradoxum* Pugsley, lxix, 44, 1931. St David's Head, Pembroke, and Malin Head, Donegal. A new species remarkable for its inflorescence: the flowers are enclosed in large, generally imperfect, spikelets which are congested in roundish heads, not imbricated in regular spikes.

467/2. *Anagallis arvensis* L. Add ✠var. e. *pallida* Hook. f. Differs from var. *carnea* Schrank in having pale pink flowers with bright crimson centres. H. W. Pugsley in *Rep. Wats. B.E.C.*, iii, No. 11 (1927-8), lxvi, 270, 1928.

549/. Notes on *Melampyrum*, by C. E. Salmon, lxvii, 105 seq., 1929, enumerates the determinations of gatherings submitted to Dr Soó and includes the following forms new to the *List* :—

549/1 b. ✠*M. cristatum* L., sub-sp. *Ronnigeri* Pöverl. Recorded from v.-c.s 19, 26, 29, 31. Type rare or wanting in Britain.

549/2 c. ✠*M. arvense* L., sub-sp. *pseudobarbatum* (Schur) Wettst. The Isle of Wight plant.

549/3 g. ✠*M. pratense* L., sub-sp. *oligocladum* (Beauv.) Soó.

549/5 e. ✠*M. sylvaticum* L., sub-sp. *subsylvaticum* Schinz & Ronn. Our normal British plant probably belongs here and not to the plant which Soó identifies as the type.

637/1. *Urtica dioica* L. Add ✠var. k. *umbrosa* Rouy (? does this = var. d. *holosericea* Fries ? P.M.H.), C. E. Britton, lxix, 313, 1931.

668/2. Add ✠*Helleborine Helleborine* (L.) Dr. × *leptochila* (Godf.) Dr., as *Epipactis latifolia* × *leptochila*, M. J. Godfery, lxiv, 67, 1926.

668/3 c. *Helleborine leptochila* (Godf.) Dr., var. *dunensis* (Steph.) raised to specific rank as *Epipactis dunensis* Godfery, lxiv, 65, 1926.

718/11(2). Add ✠*Juncus Marshallii* Pugsley, lxix, 278, 1931, subsequently reduced by Lindquist in *Rep. B.E.C.*, 1931, to rank of variety of *J. alpinus* Vill.

753/5. *Carex Grahami* Boott. Delete ? ×*saxatilis* = × *Ewingii* E.S.M., teste Kükenthal, C. E. Salmon, *Carex* Notes II, lxvii, 336, 1929.

753/36. *C. panicea* L. Delete var. c. *intermedia* (Miég.) Salmon, *l.c.*, 335.

753/47. *C. aquatilis* L. Add ×*rigida*, given with ? in *List* under var. f. *stans*. Salmon, *l.c.*, 334.

825/4(2). Add ✠*Glyceria retroflexa* (Holmboe). C. E. Salmon, lxvii, 243, 1929. Differs from *distans* in longer and more acute glumes, thicker panicle branches, which are more patent and deflexed, and more tapering spikelets. *Retroflexa* will probably prove to be the commoner species in Britain. Recorded from v.-c.s 9, 14 and 61.

844/3. Add ✠*Equisetum sylvaticum* L., var. d. *serotinum* Milde, lxiv, 70, 1926, ex H. H. Johnston, additions to the Flora of Orkney, *Trans. and Proc. Bot. Soc. Edin.*, xxix, pt. 2 (1925), 151-170.

B.—ADDITIONS AND CORRECTIONS TO "COMITAL FLORA."

6/33. *Ranunculus ophioglossifolius* Vill., lxiv, 221, 1926. C. I. and N. Y. Sandwith refer to the E. Gloster station. Add v.-c. 33 but not N.C.R., vide *T.B. Supp. 1.*

*43/4. *Draba muralis* L., lxiv, 21, 1926. ex Trans. Dev. Assoc., lvi, 111-121, 1924. Bishop's Tawton, Devon, v.-c. 3 or 4, Miss V. Fogwell.

*44/2. *Erophila Boerhaavii* (Van Hall) Dum., lxvi, 239, 1928. Ovington, W. Norfolk, v.-c. 28, 1915, F. Robinson, n. 98, in Herb. C. E. Salmon.

*88/25. *Viola latifolia* Drabble, lviii, 142, 1928. Larne, Antrim, v.-c. H. 39, G. C. Druce.

*88/31. *V. lepida* Jord., lviii, 142, 1928. Ballywater and Saintfield, Down, v.-c. H. 38, C. H. Waddell.

88/35. *V. Mackaii* H. C. Wats. (*Pesneaui* R. & F.), lviii, 142, 1928. *Dundrum, Ballywater, and Saintfield, Down, v.-c. H. 38, C. H. Waddell. *Castlerock, Derry, v.-c. H. 40, R. M. Kennedy.

*96/3. *Silene conica* L., lxix, 216, 1931. Kessingland, near Lowestoft, E. Suffolk, v.-c. 25, E. J. Salisbury.

*190/3. *Alchemilla curtiloba* Bus., lxvii, 12, January 1929. Longmorn, Elgin, v.-c. 95, Miss K. D. Little (1927).

*190/14. *A. Salmoniana* Jaquet, lxvii, 12, January 1929. Helvellyn, Westmorland, v.-c. 69, L. B. Hall (July 1921).

190/18. *A. argentea* G. Don, lxvii, 16, January 1929. Cumberland, v.-c. 70. Gatesgarth, 1844, Borrer in Herb. Mus. Brit. Buttermere Fells, 1850, coll. W. Dickinson, comm. R. Wood, in Herb. C. Bailey. Delete brackets from 70 in *C.F.*

194/2. *Rosa arvensis* Huds. (var. *ovata* (Lej.)), lxv, 155, 1927, ex Trans. Bot. Soc. Edin., xxix, 219-25, 1926. Between Burntisland and Aberdour, Fife. Delete brackets from v.-c. 85.

194/10. *R. dumetorum* Thuill., lxv, 155, 1927. Inverkeithing and Blairadam, Fife. Delete brackets from v.-c. 85.

*194/19. *R. tomentosa* Sm., lxix, 310, 1931. Borley Wood, Cambs, v.-c. 29, H. J. Riddelsdell.

232/1. *Bryonia dioica* L., lxvi, 208, 1928, ex Vasculum, xiv, 38, November 1927. Between Warkworth and Alnmouth, Cheviotland, v.-c. 68, "almost certainly native," J. W. Heslop Harrison. Delete brackets from 68.

239/1. *Eryngium campestre* L., lviii, 250, 1930. Wrotham, W. Kent, v.-c. 16, F. Druce. Add to *C.F.* but not N.C.R., vide *Flora of Kent*, which gives record from Cobham.

*304/2. *Valerianella eriocarpa* Desv., lxvii, 150, 1929. Budleigh Salterton, S. Devon, v.-c. 3, Major R. Orme.

*402/1. *Serratula tinctoria* L., lxv, 179, 1927, ex Irish Naturalists' Journal, January 1927 (first reported in same Journal, March 1926). Near New Ross, Wexford, v.-c. H. 12, R. A. Phillips. New to Ireland.

*497/2. *Symphytum tuberosum* L., lxiv, 286, 1926, ex 42nd Rep. Wats. B.E.C., 1925-26. Near Liphook, N. Hants, v.-c. 12, I. A. Williams. Probably introduced: place in brackets.

*581/4. *Lamium hybridum* Vill., lxix, 313, 1931. Weston Park, Warwick, v.-c. 38, H. J. Riddelsdell.

*615/15. *Polygonum equale* Lindman, lxiv, 69, 1926, ex Trans. Bot. Soc. Edin., xxix, pt. 2 (1925), 151-170. 10 ft. above sea-level, Clett, between the Nevi and Fishy Geo, Graemsay, Orkney, v.-c. 111, H. H. Johnston.

*653/2. *Ceratophyllum demersum* L., lxvi, 113, 1928. Guernsey, ex *La Société Guernesiaise, Report and Transactions*, x, pt. 1 (1927); Report of the Botanical Section for 1926.

668/5. *Epipactis atrorubens* Schultz, lxvii, 116, 1929. A specimen purporting to be from "moist ground, Crown Hill, Plymouth," S. Devon, v.-c. 3, O. St Brody in Herb. C. E. Salmon is thus identified by Mr J. W. White. Requires verification: add 3 in brackets.

*669/12. *Orchis O'Kellyi* Druce, lxiv, 71, 1926, ex Vasculum, xi, No. 4, July 1925, 121. Durham, v.-c. 66, J. W. Heslop Harrison.

*708/1. *Lilium Martagon* L., lxiv, 21, 1926, ex Trans. Dev. Assoc., lvi, 111-121, 1924. Luppitts, Devon, v.-c. 3 or 4, G. T. Harris.

746/9. *Scirpus parvulus* R. & S., lxvi, 24, 1928, ex Irish Naturalists' Journal, 1926, 75. Arklow, Wicklow, v.-c. H. 20. Add to *C.F.* but not N.C.R.: previously recorded in 1896.

*753/12. *Carex strigosa* Huds., lxvii, 150, 1929, ex Trans. Dev. Assoc., lx, 81-92, 1928. Woodbury, S. Devon, v.-c. 3, Major R. Orme.

753/21. *C. lepidocarpa* Tausch, lxvii, 335, 1929. *Between Herston and Godlingston Farm, Dorset, v.-c. 9, C. E. Salmon; *Goathland, N.E. Yorks, v.-c. 62, Miss M. Mennell in Herb. C. E. Salmon.

NOTE:—"*Carex* Notes II," printed pp. 332-336, 1929, was by an oversight reprinted as pp. 233-237, 1931.

*753/55. ×*C. helvola* Blytt, lxvii, 333, 1929. Above Caenlochen Glen, Forfar, v.-c. 90, C. E. Salmon.

*827/19(2). *Bromus lepidus* O. R. Holmberg (=*britannicus* I.A.W.), lxix, 316, 1931. Midsummer Common and Thriplow, Cambs, v.-c. 29, T. G. Tutin.

THE BRITISH SPECIES OF CAREX.

WILLIAM HARRISON PEARSALL.

Collectors of these plants frequently complain that they find it difficult to satisfy themselves as to the identity of their gatherings owing to the inadequacy of the available descriptions. Those given in our standard floras are necessarily brief, and have not been rewritten during the past half-century, although during that period much progress has been made in our knowledge of the genus. It is hoped, therefore, that the present paper will, in some degree, make the determination of these interesting plants more easy and stimulate their collection and study.

The genus is so large that it has been divided by authors into the following four sub-genera:—

I. PRIMOCAREX Kük. (=*Monostachyae* Fiies).
II. VIGNEA (P. Beauv.) Nees (=*Homostachyae* Fries).
III. INDOCAREX Baill.
IV. EU-CAREX Coss. et Germ. (=*Heterostachyae* Fries).

There are no British species included in subgenus III (INDOCAREX), but in the *L.C.* (1925) list of Carex species 5 belong to I (PRIMOCAREX), 18 to II (VIGNEA), and the very numerous remaining species to IV (EU-CAREX). For convenience of reference, we propose, therefore, to designate these 3 subgenera as CLASSES I, II and III (EU-CAREX), and to give a separate Key to each. In determining a species it will be necessary first to ascertain to which Class it belongs; secondly, to run it down by means of the Class Key, and, finally, to verify or rectify the name by carefully going through the full description of the species concerned.

The Classes are very easily separated, but it is necessary at the outset for the student to be fully acquainted with the differences between male and female flowers. These are protected in front by small tongue-shaped scales called glumes, which are usually of a brownish colour and possess a lighter-coloured (often green) midrib. Those of the male flowers are often longer and narrower than those of the female flowers, and behind each are the 3 stamens which constitute the male flower.

In the following descriptions only the glumes of the female flowers are described. Each of these has behind it a female flower—ovary, style and stigma—which later becomes the "fruit." Inside this fruit is the tiny nut—often an important character. (I have used the term "fruit" to avoid confusion. It is the word most often used in our floras. The correct name for this flask-shaped organ is *perigynium* or *utricle*. Hooker's *Student's Flora* properly describes the fruits as *perigynia* but uses the term "fruit" or "nut" to denote the same content. This is correct, but confusing and inconsistent—especially when used on the same page. Students would do well to remember that Hooker's " fruit " is the nut.)

In the large Class III each spikelet contains only flowers of the same sex—all male or all female, and easily distinguished as such. In Classes I and II, however, many of the spikelets are composite—the same spikelet containing both male and female flowers. These will need to be carefully distinguished. The entire collection of sessile spikelets on one stem forms the " spike " in Classes I and II. Unfortunately, in Babington's *Manual* the term " spike " is used for " spikelet " in Class III (pp. 461-473), where by " fertile spikes " we must therefore understand " female spikelets." Sometimes (e.g., *C. paniculata*) the spikelets are not sessile but borne on short or even long peduncles forming a panicle. At the base of the spikelets—especially the lowest—there is often a slender leaf-like bract, usually short but occasionally very long and even overtopping the stem.

A 6 in. metric rule marked in inches and mm. is a most useful aid in the measurement of the lengths of spikes or fruits and the widths of leaves.

ABBREVIATIONS USED.

M.—Male, ♂.
F.—Female, ♀.
St.—Stem.
Sp.—Spikelets.
(Spike is printed in full).

Fr.—Fruits.
Gl.—Female glumes.
Br.—Bracts.
Bk.—Beak.
Ls.—Leaves.

Kük.—Kükenthal, *Pflanzenreich* IV, 20, 1909.
Bab.—Babington, *Manual*, ed. 10, 1922.
Hook.—Hooker, *Student's Flora*, ed. 3, 1884.
Fitch—Fitch and Smith, *Illustrations*, ed. 5, 1901.
B. and H.—Bentham and Hooker, *Br. Flora*, ed. 7, 1924.
B. and S.—Butcher and Strudwick, *Further Illustrations*, 1930.

GENERAL KEY.

Class I—Spike simple, solitary, terminal. Species 1-5.
Class II—Spike compound, continuous or interrupted. Species 6-25.
Class III—One or more terminal spikelets wholly male—the others female. Species 26-74.

CLASS I.

Inflorescence consists of One Spikelet only.

These are small plants—none of them exceeds a foot in height and more usually they are nearer half that size, inconspicuous and easily overlooked. This Class includes 5 species, only 2 of which—*dioica* and *pulicaris*—are common. All the species are found only on wet moors, in bogs, or more rarely, upon the rocky ledges of high mountains in Scotland—see descriptions.

KEY I.

Spikelet Solitary and Terminal.

A. Sp. wholly male or wholly female, on different plants. .... *C. dioica.*
B. Sp. composite, male at the top.
  (a) Under ½ in.
    Few flowers—less than 9. No bristle. .... *C. pauciflora.*
    More than 9 flowers. Long basal bristle. .... *C. microglochin.*
  (b) Over ½ in.
    Stig. 2. Fr. acute, " flea-like." .... *C. pulicaris.*
    Stig. 3. Fr. obov.-obtuse (Sc. mtns.). .... *C. rupestris.*

1. C. DIOICA L.

This species and *C. pulicaris* are the only two of this class which are really common in England. *C. dioica* is found in wetter situations than *C. pulicaris* and is usually associated with some or all of the following species: *Molinia caerulea*, *Myrica Gale*, *Scirpus caespitosus*, *Deschampsia caespitosa*, *Agrostis alba*, *Oxycoccus quadripetala*, *Eriophorum* spp., other Carices—especially *echinata*, *Goodenowii* and *panicea*—and *Sphagnum* moss. It is a diminishing species in the S. of England.

The stem is round, wiry and normally about 6 in. high, but in the var. *scabrella* Fries may be twice that height. Ls. subsetaceous, smooth. Usually the M. or F. spikelet is borne on a different plant, but occasionally it is composite, the male flrs. below. The M. sp. is cylindric, very narrow and with narrower and paler glumes than the F. sp., which is ovoid and usually under ½ in. in length. Fruit at first erect, later spreading, ovate-lanc., 3 mm., many-veined on both faces. Gl. broadly ovate, obtuse, with broad paler margins, deciduous, slightly shorter than the fr. Beak short with rather scabrous margins. Nut ovate or oval, lenticular biconvex, fawn, closely included. Stig. 2. May-June.

2. C. PULICARIS L.

Prefers a somewhat drier habitat (than *C. dioica*) in which the following spp. may occur: *Nardus stricta*, *Deschampsia flexuosa*, *Agrostis canina*, *Anthoxanthum odoratum*, *Juncus squarrosus*, *Carex leporina*, *C. flacca*, *Prunella vulgaris*, *Luzula multiflora*, and *Polytrichum* moss. Recorded for all the v.-cs. of the Brit. Isles.

Laxly caespitose. St. 4 in.-10 in., slender, setaceous, erect, obtuse-angled, pale, smooth or slightly rough at the top. Ls. slender, filiform, rigid, involute, straight, usually shorter than the stem. Sp. composite, solitary, terminal, ½ in.-1 in., top half male, lower half (or less), lax-flowered, female. Gl. about half as long as the fruit, lanc.-ovate, subacute or rather obtuse, reddish or yellowish, broad whitish margins, green-keeled, deciduous. (M. gl. narrower and more acute). Fr. much longer than gl., erect at first, later reflexed, oblong-lanc. tapering to each end, bi-convex, 5 mm., dark brown, shining, sometimes with 2 marginal nerves. Bk. slightly furrowed, smooth, truncate and emarginate. Nut oblong, plane-convex, filling ⅔ of fruit, very shortly stipitate. Stig. 2. June.

3. C. PAUCIFLORA Lightf.

Wet moorland bogs from York to Caithness. Rhizome slender, creeping, with long stolons. St. 4 in.-6 in., slender, rather scabrous above. Ls. much shorter, narrow, canaliculate or involute, rigid, light green, often rather rough at the end. Sp. composite, a few M. flrs. at the top, obconical, ¼ in.-⅜ in. Gl. lanceolate, subacute, pale brown with lighter-coloured margins, green-keeled, deciduous. Fr. longer than gl., ultimately reflexed, narrowly oblong or fusiform, not tapering gradually to the base, pale, 6 mm., with a long smooth subulate beak, truncate at the mouth. Nut pale, oblong, much shorter than the fr. Style exserted, flexuous. Stig. 3. June, July, August.

4. C. MICROGLOCHIN Wahl.

Only known from one locality in Perthshire, since 1925. Stem 3 in.-6 in., slender, round and smooth, leafy below. Ls. shorter, rigid and filiform. Sp. ⅜ in., composite, usually containing a few more F. than M. flowers, ultimately ovate and lax. Gl. ovate, obtuse (M. gl. oblong, subacute). Fr. long, narrow lanceolate, 4-5 mm., yellow, with many faint nerves. Nut oblong, shorter than the fr. and with a long rigid bristle at its base. This is much longer than the fr. and therefore protrudes from its mouth. Stig. 3. July, August. (See *B. and S.*, fig. 404).

5. C. RUPESTRIS All.

Higher mtns. of Scotland only. St. 2 in.-6 in., triquetr., rough above. Ls. 1-2 mm. wide, markedly circinate, flatter than in *C. pulicaris* and ending in a fine rough twisted point. Sp. composite, M. at top, small, 1-1½ cm., linear-oblong, lax-flowered. Gl. broadly ovate obtuse, often mucronate, persistent. Fr. subequally long but paler, erect, obovate, 3-4 mm., faintly nerved; bk. very short. Nut subobovate, acutely angled. Stig. 3 (rarely 2). July.

CLASS II.

Several similar-looking spikelets in a continuous or interrupted spike—the terminal spikelet not wholly male (except in *C. arenaria*).

This class usually presents some difficulty to students from the fact that most of its spikelets—although apparently alike—are not really so. Most of them are "mixed" and contain both male and female flowers. It is therefore necessary for these to be carefully distinguished. There will be no difficulty if the descriptions are carefully read.

KEY II.

A. Spikelets male at the top. 1
(In *disticha* and *arenaria* nearly unisexual).

B Spikelets male at the base—rarely at the top also. 10
1. Long creeping underground stems. 2
Caespitose (tufted). 4

2. Spikelets nearly unisexual. Fruits winged.
    Upper sp. male. Fr. broadly winged. Maritime. .... *C. arenaria.*
    Upper sp. female. Fr. narrowly winged. Inland. .... *C. disticha.*
  Spikelets male at the top only. Fruits not winged. 3
3. Sp. in a densely congested roundish head. Stem simple, 2 in.-3 in. Sandy shores of Scotland. .... *C. incurva.*
  Sp. less congested, in an oblong head. Stem branched below, over 6 in. Sutherland only. .... *C. chordorrhiza.*
  Sp. in an oblong head, ⅝ in.-1 in. Near the sea in S. and E. England chiefly. Very rare inland or in Scotland. .... *C. divisa.*
4. Spike not panicled. Fruits thin and soft, large, 3-5 mm., squarrose, not gibbous, green when young. 5
  " Spike " panicled (exc. *diandra*). Fruits tough and leathery, small, 3 mm. or less, ascending, gibbous, chestnut-coloured. 8
5. Stem stout, sides grooved, angles winged and very rough. Ls. very wide, 4-9 mm. Fr. broadest at the base. .... *C. vulpina.*
  Stem more slender, sides not grooved, angles not winged and only rough above. Ls. narrow, 2-3 mm. Fr. tapering to the base. 6
6. Spike oblong continuous, densely capitate. Ligule with a small appendage. *C. contigua.*
  Spike ± interrupted at the base. Ligule with no appendage. 7
7. Spike short (2-3 cm.) and narrow. Fr. almost squarrose at maturity. Ligule broader than long. .... *C. Pairaei.*
  Spike long (5-8 cm.), sometimes shortly branched. Fr. suberect at maturity. Ligule longer than broad. .... *C. divulsa.*
8. Laxly caespitose (scattered tufts). Stem slender. Spike less than 1½ in. Ls. 1-2 mm. .... *C. diandra.*
  Densely caespitose (tussocks). Stem stout. Inflorescence elongate, panicled, 1½ in.-4 in. Ls. broader. 9
9. Stem slender. Panicle narrow and lax. Ls. scarcely 2 mm. Gl. narrow. Fr. many nerved on both sides. Prefers calcareous habitats. Rare. *C. paradoxa.*
  Stem stout. Panicle dense. Ls. 3-5 mm. Gl. broad. Fr. feebly nerved at base only. Common. .... *C. paniculata.*
10. Fr. broadly winged at the margins (serrulate above). .... *C. ovalis.*
  Fr. not winged. 11
11. Fr. ovate, densely whitish-punctulate. Beak short, subentire or emarginate only. 12
  Fr. ovate or lanceolate, not punctulate. Beak long, bifid. 13
12. Sp. 2-4, contiguous. Fr. widest above the middle and suddenly contracted to the beak, shoulders prominent (2 Sc. v.-cs. only). .... *C. lagopina.*
  Sp. 4-8, lowest remote. Fr. widest at or below the middle, no shoulders. *C. canescens.*
13. Fr. ultimately squarrose, base rounded. .... *C. stellulata.*
  Fr. suberect, base tapering. 14
14. Sp. ovate, 5-7 mm. Lower distant. Fr. ovate, 3 mm. Lowest bract foliaceous, very long, exceeding the inflorescence. .... *C. remota.*
  Sp. oblong or lin.-obl., 10 mm. Fr. narrowly lanc., and longer, 3½-4 mm. ebracteate, or 1 very short. .... *C. elongata.*

(For the hybrids *C. Boenninghauseniana* and *C. axillaris*, see full descriptions).

6. C. DISTICHA Huds. (*C. intermedia* Good.).

Rhizome long creeping woody. St. 1-2½ ft., strict, slender, rough top. Ls. 2-4 mm., long tapering. Spike oblong continuous 1¼ in.-2½ in., usually nearly ebracteate but lowest sp. may possess a slender foliaceous bract often exceeding the stem. Sp. numerous, ovate or oblong, unequal, contiguous, upper and lower F., middle mostly M. Gl. ovate acute, reddish with pale keel not quite reaching the apex. Fr. ovate or ovate-lanc., 4-5 mm. (but often abortive and twice as long), slightly exceeding the gl., conspicuously many-nerved, base shortly tapering to a short stipe; from about the middle to the apex narrowly winged and serrulate. Bk. tapered and serrulate outside, acutely bifid, later incurved. Nut rather small, olive, oval. Stig. 2. Allied to *C. arenaria* but an inland plant of marshy meadows. May, June. See *B. and S.*, 388 (fig. 406).

7. C. ARENARIA L.

Very long creeping superficial rhizomes. St. 6 in.-18 in., slightly curved, slender, but strong, scabrous. Ls. 1½-3 mm. wide about equalling st., longly tapering, rigid, light green. Sp. numerous, upper M. narrowly oblong; middle mixed; lower ovate, F., shortly bracteate. Gl. lanc.-acum. aristate, lower elongate from a wide base. Fr. shorter than gl., rounded ovate below, tapering above, 4-5 mm., glabrous, shining, many-ribbed; from middle to apex broadly winged and serrulate. Bk. deeply bifid, teeth spreading. Nut oval, rather small, shortly tapering into a stipe. Stig. 2. Maritime, abundant on sandy shores and dunes. Occasionally inland, sandy places in Surrey, W. Suffolk, W. Norfolk, and S.E. Yorks. June.

8. C. INCURVA Lightf.

Long creeping rhizomes. St. small, usually 2 in.-3 in. and " recurved so as to bring the large head down to the ground." Ls. equalling or exceeding st., very narrow, curved, involute, rigid. Sp. 3-5, mixed, in a roundish head densely congested; M. flrs. nearly hidden. Gl. broadly ovate, obtuse, pale brown, mucronate with broad hyaline margins. Fr. much larger than gl., 3½ mm., turgid, ovoid or elliptic, glabrous, base sub-rotund and shortly stipitate. Bk. short, split externally, ultimately obliquely twisted or reflexed, usually rather rough. Nut laxly included, obovoid-lenticular, shining, olive. Stig. 2. Sand-dunes and shores in Scotland chiefly. June. Var. *erecta* O. F. Lang is taller (up to 4¾ in.) with almost erect heads, longer and wider sp., and larger fruits.

9. C. CHORDORRHIZA Ehrh.

Intermediate between *incurva* and *divisa*. St. 6 in.-12 in. (with long creeping rhizomes) much branched and ± decumbent at the base. Sp. 3-5 mixed, in a congested head ± ½ in. long, ebracteate or the lowest with a shortly sheathing bract which may equal the spike. Fr. slightly exceeding the gl., ovoid, 3½ mm., brown shining with many darker veins on both sides, rather suddenly contracted into a short bifid bk. Nut ovoid or subobovate, brown, punctulate. Gl. ovate, acute, with broad margins. Stig. 2. Only known from one bog in Sutherland. July, August. (See *B. and S.*, 387, fig. 405).

10. C. DIVISA Huds.

Rootstock stout, creeping. St. slender, leafy, 3-gonous, 4 in.-20 in. (usually about 12 in.), strict, apex ± scabrid. Ls. shorter or longer than st., very narrow, 2 mm. wide, involute. Sp. 3-7, mixed, lower 1-2 often somewhat remote, lowest with a long setaceous bract sometimes exceeding the spike. Gl. ovate, acuminate, aristate, membranous. Fr. subequal to gl., ovate or oval, 3½-4 mm., shining, many-veined on both sides, base rounded: abruptly contracted into a short acutely bifid bk. with serrulate margins outside. Nut closely included, brown, almost orbicular. Stig. 2. Salt marshes and ditches near the S. and E. coasts chiefly—a few places in the W. Extremely rare inland or in Scotland. May, June.

11. C. VULPINA L.

Caespitose. St. 1 ft.-2 ft. rigid, stout with 3 very rough angles. Ls. shorter than st., broad (4-9 mm. wide), flat, light green. Sp. 5-10 greenish, ovate, mixed, lower shorter with long setaceous bracts. Spike oblong crowded continuous or interrupted below. Gl. shorter than fr., ovate mucronate. Fr. ovate or ovate-lanc., much rounded at base, ultimately squarrose not gibbous, 4-5 mm. long, green when young, veined. Bk. rather long, bifid, finely serrate. Nut oval, stipitate and beaked with the base of the stout style. Stig. 2. Distinguished from the 2 following spp. by stouter st., wider ls., and fr. more rounded at the base. Common and widespread in lowlands. Partial to dykes near the sea, wet ditches, stream and pond sides and damp woods. June.

12. C. CONTIGUA Hoppe.

Caespitose. St. 8 in. to 2 ft., strict, rather firm, apex rough. Ls. narrow, 2-3 mm. wide, flat, shorter than st. Sheaths very slender and torn at the mouths. Ligule white, longer than broad with a small appendage opposite on the other side of the st. Spike oblong, continuous, dense, ebracteate. Sp. 5-9 ovate, contiguous, the lower only their own length apart. Gl. shorter than fr., ovate acuminate aristate. Fr. ovate acuminate, 4½-5 mm. (longer and more tapering upward than in *divulsa*), green, shining, nerveless or only the base faintly nerved, ultimately patent not squarrose. Bk. long, attenuate with finely serrate margins, mouth shortly bifid. Nut completely filling the fr., obtusely quadrangular, shortly stipitate; larger and broader than that of *divulsa* and with shoulders more pronounced. Stig. 2. A common lowland species of damp gravelly roadsides and ditches: in the drier parts of marshes and copses also. June. (This is the *C. muricata* of the older editions of Bab.; and Benth. and Hooker. *C. spicata* Huds. of recent editions).

13. C. DIVULSA Stokes.

Caespitose. St. numerous, 1-3½ ft. high, slender, lax, weak, scabrous above. Ls. shorter, 2-3 mm. wide, flat. Ligule slightly longer than broad. Sp. 6-8 greyish, sub-globose or ovate, few-flowered; upper contiguous, lower 2-4 remote often shortly branched, and with setaceous bracts. Gl. ovate acuminate mucronate shorter than fr. Fr. sub-erect at maturity, roundly ovate, more elliptical in outline than *contigua*, much less gradually tapering above and therefore having a shorter bk., much less serrulate but the roughness coming well down to the shoulders; 3½-4 mm. long, glabrous, narrowly green-margined. Bk. medium, attenuate, bifid. Nut oval or subquadrangular, much smaller and narrower than *contigua* but somewhat similar in shape. Stig. 2. Moist shady places—banks of hedges and in woods—lowland. June. (*See B. and S.*, 389, fig. 407)

14. C. PAIRAEI F. Schultz.

Stem 1-2 ft. strict, rather rigid, scabrous above. Ls. shorter, 2-3 mm. wide, flat and ± rigid. Ligule short, entirely white, broader than long. Sp. 4-6 globose or ovate, small, few-flowered contiguous or the lower rather remote, sub-ebracteate. Gl. ovate mucronate. Fr. much longer than gl., finally nearly squarrose, broadly ovate or roundish, very slightly smaller than *divulsa*, 3-3½ mm. upper margins serrulate. Bk. short, nearly triangular, rough, bifid. Nut rather small, obtusely quadrate, very slightly narrower at the top. Stig. 2. Relatively rare but not uncommon upon dry hedgebanks in the S. of England. Very similar to the preceding, but distinguished by (1) Spike—*divulsa*, long (2 in.-3¼ in.) and interrupted; *Pairaei*, short (rarely over 1⅛ in.), only slightly interrupted. (2) Fruit—*Pairaei* has the shortest beak and most rounded outline of the last 3 species, Nos. 12, 13, 14. (3) Ligule—longer than broad in *divulsa*; broader than long (rarely as long as broad) in *Pairaei*. (See *B. and S.*, 390, fig. 408).

Var. *Leersii* (F. Schultz) Kük.

Much taller, with much longer spikes and larger fruits than the type. St. 2-3¼ ft., rigid and very rough above. Ls. slightly wider (2-4 mm.), and more flaccid. Ligule margin brown. Sp. with many more flrs. and the lower 2-4 more remote, so that the spike may reach to over 3 in. Fr. larger (4-5 mm.), and often with a longer bk. Nut more ovate. Dry hedgebanks, local and scarce.

15. C. DIANDRA Schrank (*C. teretiuscula* Good.).

Only laxly caespitose in scattered simple tufts. St. slender, 1-2 ft., faces rather convex. Ls. shorter, 1-2 mm. wide, grey-green. Spike oblong, dense, continuous, to 1¼ in. long. Sp. many, ovate, usually ebracteate. Gl. broad, ovate or triangular, acute or mucronate. Fr. longer than gl., ascending, ovate, about 2½ mm., shining: not striate except at the base where 2-5 short ribs (not reaching the apex) arise: base rotund and obviously stipitate. Bk. long "split to its base and overlapping on the back." Nut turbinate (obconical), stipitate and with a very short bk. Stig. 2. Boggy meadows and margins of pools. Locally common. June. (See *B. and S.*, 391, fig. 409). (Under f. *major* Koch, Kükenthal gives as synonyms *C. Ehrhartiana* Hoppe and *C. pseudo-paradoxa* Gibs. Stem taller and stouter. Ls. broader, flat. Inflorescence longer, laxer and more paniculate).

16. C. PARADOXA Willd.

Densely caespitose. St. 1-2 ft., slender, strict, angles acute and rough, faces flat. Sheaths blackish-brown, shining, split, hairy. Ls.

shorter than or equalling the st., barely 2 mm. wide, yellowish-green, flat, rigid. Inflorescence narrowly branched or dense and compound. Panicle oblong, to 3¼ in. long, lax and ebracteate. Spikes nearly erect, lower shortly and distinctly pedunculate. Sp. few, lax-flowered, ± densely arranged. Gl. lanc., acum., mucronate. Fr. equalling gl., sub-erect, broadly ovate, nearly 3 mm. long, on both faces many-ribbed, base sub-cordate and shortly stipitate. Bk. broad, long, obliquely bifid but not split (as in *diandra*) nor winged (as in *paniculata*), densely scabrid to the shoulders of the fr. Nut oval in outline with a short beak. Stig. 2. Recorded for 11 English v.-cs., chiefly in marshes on calcareous soil. June. (See *B. and S.*, 392, fig. 410).

17. C. PANICULATA L.

Densely caespitose forming elevated tussocks often 2-4 ft. diam. St. stout, rigid, 1-4 ft. high, angles very rough, faces sub-concave. Basal sheaths entire. Ls. about equalling st., 3-5 mm. wide, harsh, long, flat or the lower plicate. Panicle long (to 6 in.), broad or narrow—rarely reduced to a simple spike—branches long or short, bracts 0 or short and setaceous. Sp. numerous, crowded, pale brown, rather small. Gl. ovate, sub-aristate, pale margined and with a straw-coloured keel. Fr. equally long, ovoid, 2½-3 mm., brown, faintly veined only at the rounded base, upper part margined and densely scabrid. Bk. long, ± green, split to its base, scabrid outside. Nut ovoid, blunt, narrowed below. Stig. 2. Widely distributed and locally common in wet woods, marshes and along the sides of streams and lakes. Hybridises readily with *C. vulpina* (×*C. pseudovulpina* Richter), *C. remota* (×*C. Boenninghauseniana* Weihe) and other species of Class II.

18. C. REMOTA L.

Densely caespitose. St. 1-2 ft., slender, inclined or decumbent. Ls. narrow (2 mm. or less), light green and flaccid; usually shorter than the st. but the lower bracts are foliaceous and frequently mistaken for ls. The lowest bract much exceeds the st. Sp. 4-10, decreasing in size upward, normally 5-7 mm. long; mostly distant from each other, only the upper being approximate. Gl. oblong-ovate acute, pale brown, midrib green broad not reaching the apex. Fr. exceeding the gl., narrow, ovate-lanc., 3 mm. long, nerves few arcuate and confluent over the laxly included oval nut. Margins above the middle and lightly notched medium beak, serrulate. Stig. 2. Widely distributed and recorded for all v.-cs. except a few in Scotland. Common in wet and shaded situations. June.

19. C. BOENNINGHAUSENIANA Weihe (*C. paniculata* × *remota*).

This rare hybrid has been recorded for 10 v.-cs. but should be looked for where the 2 parent species are in proximity. Like all hybrids it is variable, approaching at times more nearly one or other of the parents. An average example shows some or most of the following characters: Densely caespitose. St. to 3 ft. in height, angles acute and very rough, faces nearly flat or slightly grooved. Ls. about equalling st., normally channelled and about 3 mm. wide. The inflorescence is usually very long—often 1 ft. or more—with many sp. variable in sex. Usually M. flrs. predominate in the upper, and F. flrs. in the lower sp., but they may be wholly M. in the upper, and M. at either or both ends in the lower. Bracts short, except the lowest which may equal or exceed the st. Gl. ovate, obtuse, silvery brown, normally equalling fr. but often shorter. Fr. lanc.-ovate, almost nerveless and usually serrulate from the middle to the moderate bk. deeply split on one side. Nut abortive, ovoid or elliptic. Stig. 2.

20. C. AXILLARIS Good. (*C. remota* × *vulpina*).

Densely caespitose. Recorded for 12 v.-cs., but—like the preceding—probably occurs elsewhere and is similarly variable. St. to 2½ ft. high, rigid, above the middle very rough on the acute angles, faces usually somewhat concave. Ls. shorter than st., flat, normally ± flaccid, to 4 mm. wide. Sp. ovate, upper crowded and simple, lower remote and composite with long bracts. Gl. ovate mucronate, brown, keel often rough. Fr. longer than gl., ovate or lanc., to 4 mm. long, serrulate above the middle. Bk. long, deeply bifid with scabrous margins. Nut obovoid, beaked, usually abortive. Stig. 2. Near the parents in wet habitats. June. (See *B. and H.*, 510, and *Fitch*, fig. 1121).

21. C. STELLULATA Good. (*C. echinata* auct. plur. *non* Murr.).

A small tufted species rarely over 1 ft. in height. St. slender, nearly smooth, strict. Ls. narrow (2 mm.), shorter than st., grey-green. Sp. 3 or 4 (5), the 2 uppermost approximate, oblong and usually M. at the base; the others rather distant, nearly globose, up to ¼ in. diam., with spreading fruits and a few M. flrs. at the base. The lowest sometimes with a short bract. Gl. ovate, acute or subacute, with wide membranous margins. Fr. twice as long as gl. ultimately widely spreading, broadly ovate, acuminate, 3½ mm. long, brownish-green, faintly nerved, round-based, when ripe stellate. Bk. long, ± incurved, bifid, edges serrate. Nut ovate, suddenly narrowed below, laxly included. Stig. 2. Common on wet moors; recorded for all v.-cs. except Hunts. May, June.

22. C. ELONGATA L.

Caespitose. St. many, 1-2 ft., slender, graceful, angles very rough, leafy. Ls. equalling or longer than st., narrow (2-3 mm.), light green, flaccid. Sp. many (8-12), oblong, densely flowered, contiguous or the lower 1-2 rarely remote. Bracts 0 or 1 very short. Gl. ovate acute or blunt and mucronulate, red-brown. Fr. nearly twice as long as gl., oblong-lanc., many-ribbed on both faces, about 3-4 mm. long, pale, base rounded. Bk. long, subulate, entire or only slightly bifid, with rough margins. Nut somewhat laxly included, elliptic obtuse. Stig. 2. Wet copses, marshes and pond sides. Local and rather rare, especially in the W. of England. June.

23. C. CANESCENS L. (*C. curta* Good.).

Caespitose. St. 12 in.-18 in., strict, slender, weak, hardly scabrid above. Ls. narrow (2-3 mm.), flat, greyish-green. Sp. 4-8, oval or elliptic, small (5-8 mm.), pale, upper contiguous, lower ± remote. Bracts 0, or rarely 1 setaceous. Gl. ovate, cuspidate, whitish. Fr. equalling or exceeding gl., 2½ mm., ovate, pale olive-green, densely punctulate, slender nerves on both faces, broadest slightly below the middle. Bk. short, emarginate, scabrous. Nut oval or obovoid, pale brown, filling the utricle, and with very short persistent beak. Stig. 2. Locally common in bogs or marshy ground, calcifuge. June. (The footnote on p. 460, *Bab.*, is correct. *Kük.*, p. 219, gives *C. vitilis* Fr., *C. curta* var. *alpicola* Wahl., and *C. Persoonii* Sieb. as synonyms of *C. brunnescens* (Pers.) Poir., which also he cites as British).

24. C. OVALIS Good. (*C. leporina* L. Fl. Suecica).

Caespitose. St. 1-2 ft., erect, rigid, smooth or slightly scabrous above, leafy to about the middle. Ls. shorter than st., about 3 mm. wide, flat. Sp. 4-6 (7) oblong-ovoid, later oval, sessile, very close together, about 1 cm. long, brownish-green, composite, bracts 0 or subulate. Gl. lanceolate acuminate, brown with paler margins and green keel. Fr. flat, densely imbricated, equalling the gl., ovate-attenuate, 4-5 mm. long, yellowish (later brown), lightly nerved and with broad scarious borders. Bk. long with membranous edges serrulate above, bidentate. Stig. 2. Recorded for every v.-c. Common on moors, heathy ground and in meadows. July.

25. C. LAGOPINA Wahlenb. (*C. leporina* Linn. *Flor. Lapponica* not *Flor. Suecica*). *C. Lachenalii* Schkuhr.

Caespitose. Very near the preceding but with st. seldom above 8 in. high, straight or slightly curved, smooth, triangular. Ls. about half as long as st., flat, grass-like, about 2 mm. wide. Sp. 3-4 ovate-obtuse or roundish, 3 contiguous, sub-clavate, the fourth rather remote. Gl. ovate nearly equalling the fr., reddish, with green nerves not reaching the apex. Fr. yellow, exceeding the gl., ovate tapering to each end, densely punctulate and about 3 mm. long. Bk. short, usually nearly entire at the mouth but often split. Nut oval filling the fr. Stig. 2. Very rare, only recorded for alpine bogs in 3 or 4 v.-cs. of Scotland. August.

CLASS III—THE LARGE CLASS.

One or more terminal spikelets wholly male (rarely partially)—
the others female.

A. BEAK SHORT.
  A. 1. Fruits glabrous. Nuts lenticular. .... (Key III. A. 1).
  A. 2. Fruits glabrous. Nuts three-angled. Terminal sp. M. at base only .... (Key III. A. 2).
  A. 3. Fruits glabrous. Nuts three-angled. Terminal sp. wholly M. .... (Key III. A. 3).
  A. 4. Fruits hairy, downy or scabrous. Nuts three-angled. Male sp. 1—in *C. flacca* 2 or 3 .... (Key III. A. 4).
B. BEAK LONG. .... (Key III. B.).

KEY III. A. 1.

Fruits glabrous. *Nuts lenticular.* Beak short.

A. Sheaths with filamentous network: lowest usually leafless. ...... *C. Hudsonii.*
Sheaths not filamentous: usually with leaves. 1
1. Stem rigid. Ls. rigid, shortly acum. Fr. often rather turgid, without nerves. (Mtns.). .... *C rigida.*
Stem more slender. Ls. flaccid, longly acum. Fr. nerved, not at all turgid. 2
2. St. stout, angles acute. Ls. broad (5-8 mm.), margins revolute. Gl. mostly acute. .... *C. gracilis.*
St. slender, angles obtuse. Ls. narrow, involute. Gl. obtuse. 3
3. Bracts shorter than inflorescence. .... *C. Goodenowii.*
Bracts longer than inflorescence. 4
4. Ls. 3-5 mm. wide. Fr. 2½ mm. long, no nerves. .... *C. aquatilis.*
Ls. narrower. Fr. larger (3-4 mm.), three-nerved. (Norfolk only). *C. trinervis.*

(*C. salina* Wahl., a very rare sedge of the extreme N. of Scotland is also included in III. A. 1.).

26. C. Hudsonii Ar. Benn. (? *C. elata* All.: *C. stricta* Good.: *C. caespitosa* Gay).

Densely caespitose. St. to 3 or 4 ft. high, rigid, angles acute and very rough. St.-ls. short and narrow, sterile ls. long and wider. Leaf-sheaths red-brown, shining, *with filamentous network.* M. sp. 1-2, linear, 1½ in.-2¾ in. long. F. sp. 2-3 (often with M. apex), stout, oblong sub-cylindrical, sessile or lowest shortly stalked, erect, longest may be up to 2⅜ in. Br. shorter than st., auricled, foliaceous. Gl. oblong-lanc., blunt or sub-acute, narrow, dark purple, green-keeled, deciduous with fr. Fr. usually longer and broader than gl., densely imbricate in regular rows, elliptical, acute, with conspicuous nerves; about 4 mm. long, base truncate, bk. short and entire. Nut roundly sub-obovate, filling about two-thirds of fr., and shortly beaked. Stig. 2. Distinguished from all other British species by its filamentous leaf-sheaths. Marshes, fen ditches, bogs and swamps on peaty soil. Locally common in such habits, but we have frequently failed to find it in counties for which it is recorded. June.

The var. *turfosa* (Fr.) of the *L.C.* (2045 b.) is, according to Kükenthal (375), the hybrid *C. Goodenowii* × *Hudsonii*, and possesses long slender stolons, a slender st., and narrow ls. with revolute margins. The sp. are shorter and more slender. The lowest bract often equals the inflorescence in height. (See *B. and S.*, 397, fig. 415).

27. C. rigida Good.

St. usually less than 1 ft. in height—often only 6 in.—rigid and nearly smooth or rough toward the top. Ls. stiff, usually outwardly recurved, shorter than the st., up to ¼ in. wide, shortly acum., yellowish green, keeled, with revolute margins. M. sp. 1; F. sp. 2-3, oval or oblong, short—rarely over ½ in.—approximate, sessile or lowest remote and shortly stalked. Lowest br. foliaceous, without sheath, little exceeding the stem. Gl. broadly ovate, obtuse apex purple or blackish, keel paler. Fr. equalling or slightly exceeding gl., ovate, obovate or elliptical, lenticular, small (3 mm.), densely punctulate, no nerves, very short entire beak, smooth. Nut filling the fr., roundish, rather longer than broad. Stig. 2. Wet and stony places on mountains. June, July. (See *B. and S.*, 393, fig. 411).

28. C. GRACILIS Curt. (*C. acuta* L. em. Good.).

St. rigid, 2-3 ft. high, apex ultimately arcuate, angles acute. Ls. equalling st., broad (5-8 mm.), flaccid, margins revolute. Sp. many, long (2 in.-4 in.), slender, narrow, rather remote. Upper (2-4) M., lower (2-4) F., of these the upper are sessile and the lower stalked, later nodding. Bracts foliaceous, lowest (1-2) longer than st., with long auricles. Gl. narrow, lanc., acum., dark. Fr. very variable in size, normally shorter than the gl. but broader; lenticular, obovoid or elliptical, narrowed below, 3 mm. long, smooth, densely punctulate, faintly 3-5 nerved, stipitate. Bk. very short, smooth, sub-entire. Nut orbicular or obovoid. Stig. 2. On the margins of lakes, streams, and in ditches and marshes. Common. June. (See *Kük.*, 320, fig. 49).

29. C. GOODENOWII Gay. (*C. vulgaris* Fries).

Very common and variable. Usually under 1 ft., but may be 2 ft. in height. Slender and often slightly curved. Ls. very narrow (2 mm.), often slender, erect, shorter or longer than st. M. sp. 1 (rarely 2), linear, pedunculate, terminal. F. sp. 2-4, oblong, rather short (to ¾ in.), approximate or lowest remote, densely flowered, sub-sessile or the lowest shortly stalked, erect. Bracts leafy, sheathless, shorter than the inflorescence or the lowest sub-equal. Gl. rather small, ovate oblong, *obtuse*, imbricate, purplish or blackish with slender green keel. Fr. longer and broader than gl., ovate, orbicular or obovate, 2½-3 mm. long, smooth, green, purplish or pitchy, faintly nerved below, neatly and regularly arranged in rows—often six. Bk. very short, entire, smooth. Nut lenticular, orbicular-ovate or elliptical, rather large. Stig. 2. Common in wet places throughout all the v.-cs. of the Brit. Isles. Numerous varieties occur and these will be described in our Report when any are distributed. May, June. (See *B. and S.*, 394, fig. 412).

30. C. AQUATILIS Wahl.

St. 1-3 ft., stiff, angles obtuse, faces convex, smooth. Ls. longer, 3-5 mm. wide, erect, grey-green, flat or canaliculate, longly acuminate. Upper 2-3 sp. M., linear cylindrical slender pale, approximate, ¾ in.-1½ in. long. Lower 3-5 sp. F., cylindric, *apex obtuse base tapering*, longer than M. sp. (1½ in.-2½ in.), erect, remote, upper sessile, lower shorter, included-pedunculate. Lowest bract exceeding st. Gl. oblong, rather small, narrower than fr., obtuse, dark with paler keel. Fr. much broader and slightly longer than gl., elliptical or obovate-elliptical, lenticular somewhat bi-convex, 2½ mm. long, densely punctulate, often granulose, glabrous, nerveless, stipitate. Bk. short, entire. Nut obovate, filling ⅔ fr. Stig. 2. Margins of lakes and mountain streams, chiefly in North Britain—rare in England. July. (See *B. and S.*, 395, fig. 413).

31. C. TRINERVIS Degland.

Found only in Norfolk. St. to 15 in., smooth, ribbed. Sp. 1-4 M.; 2-5 F. erect, very stout, short, approximate. Bracts broadening below into ribbed sheaths. Ls. and br. often longer than st. Fr. lenticular, elliptical, oblong, 4 mm. Bk. very short, entire. Gl. oblong, bluntish, shorter than, or equalling, the fr.; tawny with greenish-white 3-nerved keel. Nut longer than broad, narrowed to the short bk. (See *Kük.*, 310, fig. 48 G.).

32. C. SALINA Wahl.

St. 1-2 ft., trigonous. Ls. 3-5 mm., with scabrid keels and margins. Upper sp. (1-3) M., the others (2-4) F., cylindric, 1¼ in.-2 in. long usually on short stalks and—like all the F. sp. in this class—sometimes M. at the top. Bracts foliaceous equalling the st. Gl. ovate or lanceolate, brownish or dark purple, obtuse mucronate or aristate—the lowest with an excurrent scabrid midrib—much longer than the fr. Fr. ovoid, lenticular, veined and with a short bk. Nut roundish or obovate, unequally narrowed above and below. Stig. 2-3. Found only in the extreme N. of Scotland. July, August. (*See B. and S.*, 396, fig. 414). According to Kükenthal (362) the *L.C.* species *Kattegatensis* (2050) and *discolor* (2052) are varieties of *C. salina*; *spiculosa* Fr. is also given (381) as the hybrid *C. Goodenowii* × *salina*, but nearer the latter.

KEY III. A. 2.

Nut with 3 angles. *Terminal spike Male at the base only.* Fruits glabrous.

(The first 2 species are very rare and not found in England. The last is found sparingly on Snowdon and also on mountains in Scotland).

1. Spikelets sessile and erect. 2
   Spikelets stalked and drooping. 3
2. Fruit small (2-3 mm.), tapering at each end, base cuneate. Glume rather small, sub-acute or sub-obtuse. .... *C. alpina.*
   Fruit ± longer than 3 mm., oval, blunt. Glume rather larger, cuspidate. *C. polygama.*
3. Upper spikelets shortly, lower longly, stalked. Apex of stem ± drooping. *C. àtrata.*

33. C. ALPINA Swartz (*C. Vahlii* Schkuhr).

St. 6 in.-12 in. high, erect, strict, acute-angled, leafy below, rough above. Ls. narrow (2 mm.), shorter than the st. Sp. (1-4) roundish or oblong contiguous, upper sessile lowest shortly stalked. Fr. small, 2 mm., obovate, trigonous, base cuneate, nerveless, rough above with a very short notched beak. Nut sub-obovate, 3-angled, rounded above with a short beak. Gl. small, ovate, usually acute, blackish. Stig. 3, short. Found only in 3 v.-cs. of Scotland. July.

34. C. POLYGAMA Schkuhr (*C. Buxbaumii* Wahl.: *C. fusca* Bailey not All.).

St. 1-2 ft., strict, rigid, angles acute, leafy below, scabrid above. Ls. narrow (2-3 mm.), shorter than st., longly acuminate, their sheaths "connected by netlike filaments." Lowest bract often exceeding the st. Sp. 3-5, oblong, obtuse, contiguous sub-clavate or the lowest rather remote and very shortly stalked. Gl. oblong-ovate, nearly black, with the 1-3 nerved green keel prolonged into a cuspidate point. Fr. oval or sub-obovate, about equalling the gl. in length but much broader; when mature trigonous, veined and imbricate. Bk. very short, bidentate. Nut obovate, trigonous, brown, dotted. Stig. 3. Very rare. only certainly known now from spongy bogs in West Inverness. June.

35. C. ATRATA L.

St. 1-1½ ft. high. triquetrous, smooth. Ls. shorter, flat, broad (3-4 mm.). Sp. 3-5 oblong, upper shortly, and lowest longly pedunculate and finally drooping. Fr. oval or obovate, slightly narrowed below, shorter but broader than the gl., compressed but 3-angled, nerveless, punctulate, 3½ mm. long. Gl. narrowly ovate, acute, dark purple, with slender pale keel. Bk. short, round, slightly notched. Nut much shorter than fr., ovate or elliptic, trigonous. Stig. 3. On wet alpine rocks—Snowdon and high mountains of Scotland. June, July. (*Fitch*, fig. 1133, shows the fr. too narrow, much too tapering above and with bk. too long).

KEY III. A. 3.

Nut with 3 angles. *Terminal spikelet wholly male.* Fruits glabrous.

1. Bracts always sheathing. 2
Bracts not sheathing. 5

2. Bracts shortly sheathing. 3
Bracts longly sheathing. 4

3. Ls. channelled, rough at the edges. .... *C. limosa.*
Ls. flat, smooth at the edges. .... *C. magellanica. C. rariflora.*

4. (a) F. sp. erect.
Ls. longly tapering, grey-green. .... *C. panicea.*
Ls. shortly acum., deep green. .... *C. vaginata.*

(b) F. sp. drooping.
Stem 2 in.-6 in. only. Ls. narrow (1½-2 mm.). Lowest br. including several stalks. .... *C. capillaris.*
Stem 2 ft. Ls. broad (6-10 mm.). Fruit oblong-lanceolate. ...... *C. strigosa.*

5. Stem 3-5 ft. Spikelets often 3-4 in. long, gracefully pendulous on very long stalks. (Wet woods). .... *C. pendula.*
Stem 1-1½ ft. Spikelets blunt, ⅝ in., pale green. Marshy places. *C. pallescens.*

36. C. LIMOSA L.

St. small, seldom over 1 ft. high, wiry, strict, leafy below. Ls. shorter, narrow, 1-2 mm., linear, keeled and canaliculate, the greater part of their margins rough. Sp. 1-2 (rarely 3). Terminal sp. linear, erect, M. Lateral F. ovate or oblong, on very long stalks, drooping (apex often M.). Bracts slender, auricled, short, strongly keeled and shortly sheathing. Gl. ovate or ovate-lanc., purple with a green (1-3 nerved) keel. Fr. slightly shorter and broader than the gl. (often 4 mm. long), regularly elliptic in outline with a tendency to be broadest above the middle and sub-obovoid (*Fitch*, fig. 149, shows the form of the fr. perfectly), pale strongly ribbed with a very short entire or emarginate bk. Nut obovoid, pale, bluntly trigonous. Stig. 3. Wet spongy peat bogs, often growing in mud (*limosus*). June.

37. C. MAGELLANICA Lam.

Found in similar situations to the preceding but only in N. England and Scotland. It somewhat resembles *C. limosa* but is a rarer species showing the following distinctive characters. It possesses more sp. (3-4) and they are much less densely flowered. Bracts equalling or exceeding the st. Gl. lanceolate, longer and narrower than the fr., longly acuminate or even aristate, but early deciduous. The green keel is less apparent than in *C. limosa.* The fr. is slightly shorter than that of *C. limosa* (3 mm.: 3-4 mm.) and possesses a tendency to suddenly bulge about the middle or below it—sometimes on one side only. (See *B. and S.*, fig. 416). The ls. are wider and the greater part of their margins smooth (*v.v.* in *limosa*). June, July.

38. C. RARIFLORA (Wahlenb.) Sm.

This species also is allied to *C. limosa* but more remotely than *C. magellanica.* It is much rarer than either, in the alpine bogs of Scottish mountains. Its distinctive characters are: Sp. 3 (rarely 2 or 4), narrow and few-flowered, the F. sp. drooping, lax and not over ½ in. long. Bracts shorter than peduncles. Fr. ellipsoid, tapering to each end, with an extremely short entire bk. Gl. partially folded round the fr. and exceeding it; not tapering gradually as in the 2 preceding species but more suddenly, and ending in a minute apiculus: early deciduous and hence often missed. Stig. 3. (See *B. and S.*, 399, fig. 417). June.

39. C. PANICEA L.

St. 1-2 ft., slender, obtusely triquetrous, smooth, leafy below. Ls. shorter, 2-4 mm. wide, longly tapering, harsh, glaucous. Sp. about 3, terminal M., longly pedunculate, oblong-linear, about ¾ in. long: lateral 1-2 (rarely 3) F., lax-flowered, oblong-cylindrical, erect, remote on exserted stalks. Bracts foliaceous, shorter than the st., with close sheaths. Gl. ovate, oblong, subacute but very variable and sometimes even longly acuminate: dark brown (with a green keel) contrasting strongly with the paler fr. behind. Fr. sometimes twice as long (4 mm.), finally subglobose much inflated, pale green or brownish, veinless and densely punctulate. Bk. short, round, truncate. Nut laxly included, ovate or obovate, brown, trigonous. Stig. 3. Common in all the divisions of the Brit. Isles. Often confused with *C. flacca* which, however, prefers drier and calcareous soils. It also possesses 2-3 (rarely 1) M. spikelets. June.

40. C. VAGINATA Tausch (*C. phaeostachya* Sm.: *C. Meilichoferi* Sm.: *C. sparsiflora* (Wahl.) Steud.).

St. 5 in.-6 in. (rarely to 16 in.) high, often curved, leafy below. St.-ls. very short; sterile ls. longer, but not equalling st., 3-5 mm. wide. Sp. few (3-4), remote. Terminal M. sub-clavate, tawny. Lateral 2-3, F., oblong, lax, pedunculate, erect. Bracts with funnel-shaped sheaths. Gl. broadly ovate, obtuse or mucronate. Fr. longer than gl., ovate, tapering to each end, trigonous, about 4 mm. long, nerveless or with 2 lateral nerves often prominent. The bk. and tapering upper part of the fr. are frequently arcuate—giving an almost sigmoid appearance to the fr. as a whole—and the bk. is " obliquely truncate " in such cases, smooth and ultimately rather deeply bifid. Nut laxly included, small, trigonous, elliptic or ovate tapering below. Stig. 3. Frequent on wet grassy slopes of Scottish mountains only. July. (See *B. and S.*, 402, fig. 420).

41. C. CAPILLARIS L.

St. 4 in.-8 in., wiry, strict, 3 obtuse angles, smooth. Ls. chiefly radical, flat, recurved, narrow (1½-2 mm.). Sp. small; terminal M., very slender, linear, 5-10 mm., pedunculate, often shorter than the topmost F. sp.; lateral 2-3 oblong, few-flowered (5-10), lax, with long capillary sparsely scabrid arcuate peduncles. Bracts longly sheathing. Gl. obovate, short broad blunt, mucronate, early caducous. Fr. much longer than the gl., elliptic-lanc. narrower below, nerveless, small (3 mm.), brown, shining, often slightly curved. Bk. slender, short, subentire. Nut pale, closely included, obovoid triquetrous (with faces rather concave). Stig. 3, short. Local and rare. On wet grassy slopes of mountains in Scotland and the N. of England—not in Wales. June.

42. C. STRIGOSA Huds.

This species much resembles *C. sylvatica*, and as both occur in damp woods the distinctive characters of each should be noted. *C. strigosa* has shorter smooth peduncles, longer and more slender F. sp., and fruits with a shorter bk. St. 1-2 ft., weak, smooth. Ls. shorter than st., very broad (6-10 mm.), flat, shortly acum., flaccid, deep green. Sp. 4-6, distant linear-cylindric—the " Thin-spiked Sedge "—terminal sp. M. (occasionally composite); lateral sp. F., long (up to 3 in.), slender, very laxly flowered on capillary smooth peduncles almost hidden by the long sheaths of the bracts. Gl. ovate or elliptic-lanc., mucronate, pale. Fruit much longer than the gl., oblong-lanceolate (spindle-shaped) narrowed at both ends but not tapering above into a *long* beak, as in *C. sylvatica*. Also much smaller (3-3½ mm.) than the fr. of that species (5-5½ mm.), and frequently ± curved. Bk. short, pale, abruptly contracted, emarginate. Nut elliptic or obovate, trigonous with stout angles. Stig. 3. In damp woods of England, rare. Extremely scarce in Wales, and unrecorded for Scotland. May, June. (Compare *Fitch*, fig. 1152, with fig. 1151, for fruits—or *Coste*, 3895-3896).

43. C. PENDULA Huds.

One of our largest Carices. Stems up to 6 ft., and ls. over ½ in. wide. St. 3-6 ft., stout, angles round, smooth or not. Ls. few, shorter than the st., longly sheathed, 8-16 mm. (5/16 in.-5/8 in.) long. Sp. 5-6 remote, very long (2 in.-4¾ in.) and gracefully pendulous; peduncles firm and rough. Lowest bract equalling the stem and longly sheathed. Gl. rather small, ovate, very rough. Fr. longer than the gl. and broader, ovoid or elliptic, turgid, pale green; 3-3½ mm. long, nerveless, densely punctulate with a short bk. (often curved), smooth, emarginate or bidentate and ciliate in the notch. Nut rather short, broad, ovate, pale and stipitate. Stig. 3, short. Widely distributed in damp woods or in wet ditches. May, June. *Coste*, 517, gives the length of the F. sp. as 10-20 cm. (4 in.-8 in.).

44. C. PALLESCENS L.

St. 1-1½ ft., slender, triquetrous, angles acute, rough above and sparsely pilose. Ls. shorter, 2-3 mm. wide, light green, flaccid, with scattered hairs and slightly hairy sheaths. Ligule very short. Sp. 3-4; terminal M., sub-clavate, small, about ½ in. long; lateral oval-oblong, 1-2 cm (⅜ in.-¾ in.), pale green, obtuse, approximate or the lowest remote, ± stalked, peduncles capillary, smooth. Bracts foliaceous, the lowest often shortly sheathing and exceeding the st., undulate. Gl. ovate, pale, mucronate or cuspidate, margins whitish. Fr. exceeding the gl. oblong-ellipsoid, inflated, trigonous, smooth, shining, pale green, base rounded, apex obtuse, entire or bk. obscure. Nut laxly included, obovate or elliptic, trigonous. Stig. 3, short. Not rare, and easily recognised. Damp woods, meadows, marshy places and damp slopes of hills. June. (See *Kük.*, 430, fig. 68, G. and H.).

KEY III. A. 4.

Nut with 3 angles. Male sp. 1. (*C. flacca* 2-3). *Fruit hairy, downy or scabrous.*

1. Bracts sheathing. 2
   Bracts *not* sheathing. 4
2. Stems central. .... *C. humilis.*
   Stems lateral. 3
3. Sp. remote, straight. Gl. apex, emarginate, mucronate. Fruit 4-5 mm. *C. digitata.*
   Sp. near together, often curved. Gl. usually truncate, ± rounded. Fruit 3 mm. *C. ornithopoda.*
4. Bracts not sheathing. Sp. densely flowered. 5
   Lowest bract shortly sheathing. Sp. more lax. .... *C. caryophyllea.*
5. Bracts foliaceous. Fr. covered with copious white down; 2 mm. *C. tomentosa.*
   Bracts glume-like, amplexicaul. 6
6. Fr. very shortly downy; 2-2½ mm. .... *C. ericetorum. C. pilulifera.*
   Fruits hairy, 3-3½ mm. .... *C. montana.*

45. C. HUMILIS Leyss. (*C. clandestina* Good.).

A tiny species found only among the short grass of limestone hills or chalk downs in 7 v.-cs.—N. and S. Wilts, N. Somerset, W. Gloster, Hereford, Dorset, S. Hants. St. central, usually about 2 in.—never more than 6 in.—filiform, flexuous, erect and nearly concealed among the much longer radical ls. These are narrow (1½ mm.), at first flat and light green; later deep green and channelled. Sp. 3-5, distant. Terminal solitary, M., tapering at both ends and up to ¾ in. long; lateral oblong, small, to 1 cm. (⅜ in.) long, very laxly flowered (2-4), and pedunculate. Bracts sheathing, nearly hiding the sp., large, reddish with very broad membranous apex. Gl. oblong-ovate, or sub-orbicular, shortly mucronate, rolled inward. Fr. shorter than gl., nearly erect, obovate, pubescent, obtusely trigonous, 3 mm. long, base tapering. Bk. very short, entire or very slightly bifid. Nut obovate trigonous. Stig. 3. April. (See *Fitch*, fig. 1134).

46. C. DIGITATA L.

Woods on limestone or chalk, rare, 16 v.-cs. Rootstock very stout, tufted. St. many, lateral, 6 in.-10 in., slender, obtusely trigonous, curved. Ls. 2-4 mm. flat, lower recurved, serrate, rather softly hairy. Sp. 3-4, sub-fastigiate. Terminal M. sessile; lateral slender, curved, linear, ¾ in. long, upper (1-2) exceeding the M. sp., shortly stalked; lowest ± remote, all laxly flowered (5-8). Bracts sheathing, the long brown sheaths enclosing the sp. and peds.—except the lowest which has a setaceous leaf-like pt. Fr. pyriform (see *Fitch*, fig. 1135), to 4 mm. long, pubescent, trigonous with lateral nerves elevated; base long, wide, tapering. Gl. embracing the fr., broad, obtuse, obovate, apex emarginate-mucronulate, margins uneven denticulate; shining pale brown. Bk. very short, nearly entire. Nut obovate, faces concave, longly and broadly stipitate, apex ± ring-shaped. Stig. 3. April, May.

47. C. ORNITHOPODA Willd.

A rare sedge of calcareous pastures and limestone cliffs in Derbyshire, Yorkshire, Westmorland (J. B. Foggitt !) and Cumberland. Formerly included under *C. digitata* from which it differs in having its 3-4 sp. close together, and its smaller fruits exceeding the gl. (those of *digitata* are subequal). It is also a smaller plant (3 in.-5 in.) with st. slender, flexuous, bare and often finally decumbent. Ls. shorter than st., 2-3 mm. wide, flat, shortly cuspidate, serrate and often pointing downward. Terminal sp. linear, short (4-6 mm.), partly hidden, pale brown, M.; lateral (2-3) F. linear-oblong, short (6-10 mm.), very few-flowered (4-6), erect or curved, exceeding the M. sp.—lowest sometimes slightly remote with longer stalk. Bracts membranous, much shorter than the sp. Gl. pale brown, truncate or obtuse. Fr. exceeding the gl., sub-erect, pyriform, obtusely trigonous, not exceeding 3 mm., pubescent, lateral nerves distinct, base tapering and curved. Bk. short, entire, truncate, rather curved. Nut elliptic, subtrigonous with concave faces, shortly and broadly stipitate, bk. minute. Stig. 3. (See *B. and S.*, excellent fig. 418).

48. C. CARYOPHYLLEA Latourette (*C. praecox* Jacq.: *C. verna* Chaix).

Common on the grassland associations of limestone or chalk moors and heaths. St. slender, 3 in.-12 in., leafy below. Ls. narrow (2 mm.), grass-like. Sp. 3-4 approximate sessile or lowest slightly remote and stalked. Terminal subclavate, M., linear, 1 cm. (⅜ in.). Lateral oblong F., dense, contiguous, 6-10 mm. long, sessile or (rarely) the lowest slightly stalked. Br.-sheaths short. Gl. small broad ovate, brown, shining, obtuse and mucronate, or acute, green keeled. Fruits subequal to gl., obovate or elliptic, olive, about 2½ mm. long, pubescent. Bk. very short, conical, sub-emarginate. Nut 3-gonous, broadly obovate, narrowed below, base stipitate, apex crowned with a minute ring. Stig. 3. April, May.

49. C. TOMENTOSA L.

Damp meadows or grassy downs in E. Gloster, N. Wilts., Sussex, Surrey, Middlesex and Oxford. St. 10 in.-18 in., slender, erect, strict with 3 acute angles scabrous above, leafy below. Ls. shorter than the st., narrow (1½-2 mm.), grey-green, revolute. Sp. 2-3, terminal M. cylindrical, up to 1 in. long, shortly stalked: lateral F. (1-2) oblong, blunt, densely-flowered, 8-14 mm. long, approximate to the M. sp. or lowest slightly remote. Br. foliaceous, obliquely spreading, lowest longer than its sp. Gl. broadly ovate, back with broad 3-nerved green keel, shortly mucronate not ciliate. Fr. often twice as long, orbicular-obovate obtusely trigonous, 2 mm., pale green densely covered with a short white down; nerveless, contracted at the base; scarcely beaked, mouth slightly emarginate. Nut blunt, trigonous, narrowed below. Stig. 3, moderately long. June. (*Fitch*, fig. 1139, shows the fr. insufficiently narrowed below).

50. C. ERICETORUM Poll. (*C. ciliata* Willd.).

Found only among the short grass of chalk hills in E. England—W. Suffolk, W. Norfolk and Cambridge. Allied to the preceding, 48 and 49. St. 3 in.-6 in., slender, smooth, leafy below. St.-ls. short, 2-4 mm. wide, with long sheaths; sterile ls. longer but much shorter than the st., longly acuminate, often recurved. Sp. 2-3 (rarely 4) sessile, approximate. Terminal M., fusiform, ± ½ in. long: lateral ovate, F., small (6-8 mm.), sessile. Bracts very short, scarious. Gl. broadly obovate, apex bluntly rounded, finely *ciliate*. (Cf. 48, 49, 51). Fr. equalling or exceeding gl., obovate, obtusely trigonous, finely hairy above, about 2 mm., base tapering. Bk. very short, truncate, ± emarginate. Nut ovoid or subglobose, trigonous with no apical disc or prominent angles. Stig. 3. April, May. (See *B. and S.*, 401, fig. 419).

51. C. PILULIFERA L.

Very densely caespitose. St. 6 in.-12 in., slender but firm, slightly incurved, angles acute, rough above. Ls. shorter, 2 mm. wide, long tapering acumen rough. Sp. 4-5 closely contiguous—or lowest slightly remote—sessile: terminal sp. M., slender, short: lateral 3-4 (very rarely 2), F., nearly globose small (5-6 mm. diam.), dense, but few-flowered. Br. hardly leafy, except the lowest. Gl. broadly ovate, acute, mucronate. Fr. subglobose or orbicular-obovate, turgid, pubescent, about equalling the gl.; base cuneate. Bk. short, blackish, ultimately notched. Nut closely included of similar shape to the fr. Stig. 3. Rather frequent on damp heaths. May. (*Fitch*, fig. 1138).

52. C. MONTANA L.

Very near the preceding from which it is distinguished easily by its hairy fruits, inconspicuous bracts and much darker gl. In pastures, woods and upon heaths generally, but chiefly in W. and S. England. April and May. St. 4 in.-12 in., filiform, weak. Ls. narrow (2 mm.), sparsely pilose below, light green, soft, usually shorter than st., but occasionally longer and often glabrous when old. Sp. 3 (rarely 4) approximate, sessile; terminal M. solitary, stout, up to ¾ in. long; lateral —usually 2, rarely 1 or 3—F., very close together, slightly longer (6-8 mm.) than those of *C. pilulifera*, broadly ovoid and few-flowered. Br. small, glume-like with scarcely any leafy point, only the lowest having an awl-shaped bristle. Gl. very dark, broad, obovate, midrib pale, apex obtuse (or retuse) and mucronulate. Fr. exceeding the gl., elliptical or obovate, trigonous not inflated, 3-3½ mm. (rarely 4 mm.), slightly longer (not " twice as long," *B. and H.*, 515) than that of *C. pilulifera*; *densely hairy*, base tapering. Bk. very short and notched. Nut obovate, pale, longly stipitate. Stig. 3.

53. C. FLACCA Schreb. (*C. glauca* Murr. The *L.C.* (2054) gives *C. diversicolor* Crantz for this species. Kükenthal (733) queries this name as a synonym of *C. acutiformis* Ehrh.).

This is an extremely variable species, intermediate in many ways between the preceding and following species and therefore difficult to classify. It has many of the characters of *C. panicea* and is still often confused with that species by beginners. While both are quite common and occur in every vice-county, they are found usually in very different habitats—*C. flacca* preferring the drier heaths, pastures and roadsides, especially upon limestone or chalk, *C. panicea* being more often found in the wetter marshes, bogs or meadows. Even when they are growing in proximity the same relative differences will be apparent to the discerning eye. A glance is usually sufficient to distinguish the one from the other—*C. flacca* possesses 2 or 3 male sp., but *C. panicea* only 1.

St. varies from 6 in. to 2 ft. in height, rigid, wiry, obscurely trigonous, smooth, leafy below. Ls. shorter than st., narrow (2-4 mm.), erect or recurved, rigid, glaucous. Sp. 4-5; upper 2-3 (rarely 1) M. narrow, contiguous 2-3 cm. long; lower 2-3 F. (apex often M.), cylindric, 2-4 cm. long, dense, equally remote on short setaceous scabrid stalks, erect at first, ultimately pendulous. Br. foliaceous, lowest often exceeding the st.—sheaths short or none. Gl. ovate, dark brown, acute or obtuse, often very shortly mucronate. Fr. slightly longer (to 3 mm.), ellipsoid or obovoid, blunt, very dark, slightly granulose-rough, not ribbed. Bk. very short, entire, truncate, often curved. Nut obovate, trigonous, lower faces ± concave. Stig. 3. June.

KEY III. B.

Beak of fruit long.

Leaves not transversely septate (no short transverse bars between the longitudinal nerves). 1
Leaves transversely septate. 11
1. Bk. slightly bifid, smooth [not " long cloven " (*Bab.*), but long, cloven]. *C. sylvatica.*
   Bk. conspicuously bifid. 2
2. Stems often lateral. Br. shortly leafy. Style persistent. (Fr. nearly globose, very large—to 8 mm.—and few. Dry woods, very rare, only 3 v.-cs.). *C. depauperata.*
   Stems always central. Br. longly leafy. Style deciduous. 3

3. Stems stout. Ls. broad. F. sp. cylindrical, long (to 4 in.). Bk. deeply bifid. *C. helodes.*

Stems slender. Ls. narrow. F. sp. cylindrical or ovate, but scarcely ¾ in. Bk. less deeply bifid. 4

4. Sp. oblong-cylindr., ± remote, at least the lowest, pedunculate. All bracts longly sheathing. 5

Sp. roundish-ovate, or oblong. Near together, sessile, only the lowest often remote and shortly pedunculate. All bracts with short sheaths. 8

5. Stolons short, stout. Sp. ovate or ovate-oblong (1-1½ cm.). Gl. sub-acute not mucronate. Legs of bk. on the inside, smooth. .... *C. Hostiana.*

Caespitose. Sp. oblong-cylindrical. Gl. mucronate. Legs of bk. on the inside, scabrous. 6

6. Gl. pale red. Fr. tumid, shining, hardly trigonous. Bk. margins smooth. *C. punctata.*

Gl. darker. Fr. obtusely trigonous. Bk. margins scabrous. 7

7. Densely caespitose. Sp. 1½-2 cm. Gl. brownish. Fr. yellowish-brown, equally and faintly ribbed. Nut nearly filling the fr. .... *C. distans.*

Laxly caespitose. Sp. 2-3 cm. Gl. dark purple, midrib greenish-yellow. Nut much smaller than fr. .... *C. binervis.*

8. Sheaths of ls. with conspicuous appendages in front. Bracts rarely divaricate. Fr. obliquely spreading. Ls. and br. very narrow (2 mm.), long and convolute. .... *C. extensa.*

Sheaths scarcely appendiculate. Bracts always divaricate or reflexed. Fr. ultimately squarrose. Ls. and br. wider. 9

9. Stem tall. Fruit longly beaked. 10

Stem short (2 in.-6 in.). Bk. short, straight, suddenly contracted. Fr. smaller (2-3 mm.), and more numerous. .... *C. Oederi.*

10. Ls. 3-5 mm., yellowish-green. Sp. ovate, or sub-globose, less dense. Fr. 5-6 mm., bk. often deflexed. Terminal M. sp. sessile or shortly stalked. *C. flava.*

Ls. 2 mm. deep green. Sp. oblong, or oblong-ovate, very dense. Fr. scarcely 4 mm. Bk. less long and only in the lower fr. deflexed. Terminal M. sp. conspicuously stalked. .... *C. lepidocarpa.*

11. Fr. glabrous. 12

Fr. ± hairy. 17

12. Fr. membranous (thin and soft); longly rostrate. 13

Fr. rather leathery or corky; shortly rostrate. 16

13. Fr. obtusely trigonous, scarcely inflated. Style slender. ... *C. Pseudo-cyperus.*

Fr. very inflated. Style stout, tortuous. 14

14. Fr. ultimately divaricate, suddenly rostrate. Ls. canaliculate. ... *C. rostrata.*

Fr. obliquely spreading, rather gradually rostrate. Ls. flat. Stem rough. 15

15. Male sp. 2-3. Female sp. oblong-cylindric. Br. exceeding stem. Gl. narrowly lanc.-acum. Fr. many-nerved. Bk. bifid. Stig. 3. .... *C. vesicaria.*

Male sp. 1. Female sp. oblong-ovate. Bracts short. Gl. ovate, subacute, dark. Fr. very faintly nerved. Bk. emarginate. Stig. 2. .... *C. saxatilis.*

16. Fr. dull olive, densely papillose. Bk. very short, emarginate. *C. acutiformis.*

Fr. brownish-olive, not papillose. Bk. short, deeply bifurcate. ...... *C. riparia.*

17. Fr. ± densely hairy and inconspicuously nerved. Beak-teeth short. *C. lasiocarpa.*

Fr. less densely hairy. Nerves conspicuous. Beak-teeth long. .... *C. hirta.*

54. C. SYLVATICA Huds.

This is a common species in the shade of damp woods and it is necessary at the outset to distinguish it from *C. helodes* (*C. laevigata*) which is also found in similar situations but prefers wetter woods and marshes. They cannot be distinguished by the single character given in *B. and H.*, p. 517—both have most of their F. sp. drooping. Those of *C. sylvatica* are very much narrower, laxer and more scraggy-looking than those of *C. helodes* which are fusiform, densely-flowered and well-shaped. The peduncles of *C. sylvatica* are very rough, those of *C. helodes* nearly smooth, and the latter is usually a taller plant. *C. sylvatica* is normally 1-2 ft. high, the st. obtusely angular and firm, but the apex slender and arched. Ls. shorter, 4-6 (8) mm. wide, upper more gradually tapering above than the lower, rather soft and thin with ± transparent veins. Sp. 4-6, the terminal M., narrow (up to 1½ in. long), stalked and often curved: lateral (3-5) F., narrowly cylindrical, up to 2 in. long, and lax-flowered, those near the top ± approximate and shortly stalked, the others distant, longly stalked and pendent. Peduncles very rough. Upper br. setaceous, lowest foliaceous shorter than st., with long sheaths. Gl. ovate-lanc., acuminate aristate, pale; green keel rough. Fr. exceeding the gl., ultimately spreading, ellipsoid, obtusely trigonous (5-5½ mm.), glabrous, base narrowed and upper part tapering to a long slender bk. with smooth—rarely slightly rough—margins and usually a few cilia in the notch. This is shortly bifid—not " long cloven " (*Bab.*, 471) but long, cloven. Nut obovate, laxly included, with lower faces concave. Stig. 3, long. May, June.

55. C. ATROFUSCA Schk. (*C. ustulata* Wahlb.).

This species is not included in our Keys. It is very rare, being recorded only from Perthshire. It is not extinct—as given in *B. and H.* (older ed. 497), but corrected in the latest ed. 514—and should not be gathered but examined *in situ*. The following description will distinguish it from (35) *C. atrata* to which it is closely allied. St. 4 in.-12 in. high, slender, the apex cernuous, angles obtuse and smooth below. Ls. much shorter, 3-4 mm. wide, rather soft. Sp. 3-5 dark brown, contiguous or lowest ± remote, with smooth capillary drooping stalks. Terminal sp. M., short, linear-oblong (*atrata* is fusiform)—rarely wider and composite. Lateral (2-4) ovate obtuse dense. Br. short, only the lowest leaf-like and longly sheathing. Gl. lanceolate acuminate, dark with slender yellow keel. Fr. equalling the gl. but much broader, elliptical, about 5 mm. long (*atrata* about 3½ mm.); dark, often paler below, nerveless, glabrous, minutely granulose (*atrata* densely punctulate). Rather abruptly contracted into a short, slightly bifid, rough beak. Nut much smaller elliptical-triangular, longly stipitate and often also with a long bk. Stig. 3. July. (See *B. and S.*, 403, fig. 421).

56. C. DEPAUPERATA Curt. ex With.

A very rare sedge found only in the dry woods of N. Somerset and Surrey. St. 1-2 ft., strict slender smooth and leafy. Ls. shorter than the st.—the lowest bracts are leafy, usually mistaken for ls. and are longer than the st.—2-4 mm. wide, soft, rough above. Sp. 3-5; terminal M., narrow, about 1 in. long, stalked; lateral (2-4) F., oblong, very few-flowered (3-6) and lax, shorter than the M. sp.; the uppermost is near the M. sp. but the others are remote, the lowest distant—all ± erect on rough peduncles. Gl. lanceolate acuminate (the M. gl. is blunt), pale. Fr. large (to 8 mm. long) ovate-rhomboidal, smooth, equally and many-nerved, base tapering to a pronounced stipe. Bk. long rough-edged or smooth, and deeply bifid. Nut fully included, obovate, truncate above, tapering below. Stig. 3, long. June. (See *B. and S.*, 404, fig. 422—excellent).

57. C. HELODES Link (*C. laevigata* Smith).

An uncommon sedge of wet woods and their adjacent marshes. Known in the field by its graceful bearing and its long leaf ligule. St. 2-3 ft., stout, smooth, leafy in lower half. Ls. shorter, broad (6-10 mm.), flat shortly acuminate, pale green, longly and loosely sheathed. Ligule long, adnate on the back, with a smaller free one opposite to it. Sp. 4-5. remote; terminal sp. M. (rarely another smaller), cylindrical (up to 2 in. long): lateral (3-4) F., fusiform (¾ in.-2 in.), dense, the upper shortly stalked and ± erect, the lower longly stalked and drooping. peduncles slender and nearly smooth. Br. sheathing, long and leafy. Gl. lanceolate acuminate. Fr. longer (4-5 mm.), ovate striate, obliquely spreading, pale green, base contracted and rounded. Bk. long, broad rough edged or nearly smooth, deeply bifid; "legs" subulate and ciliate on both edges. Nut small—about half as long as the fr.—orbicular or obovate, narrowed at each end, shortly stipitate. Stig. 3. June or later. (See *B. and S.*, 405, fig. 423).

58. C. HOSTIANA DC. (*C. Hornschuchiana* Hoppe: *C. fulva* Host).

Rather common in marshy fields and wet places generally. St. 1-1½ ft. high, slender, remotely leafy below. Ls. much shorter, 2-4 mm. wide, flat. Sp. 3-4; terminal sp. M., stalked; lateral (2-3) F., ovate-oblong, short (10-15 mm.), dense, stalked, remote on smooth stalks, erect. Br. leafy, variable in length, usually (except the uppermost) exceeding their spikes and the lowest may equal the M. sp.—all longly sheathing. Gl. broadly ovate, subacute but not mucronate, brown. Fr. exceeding the gl. ovate-elliptical, 3-4 mm., with many nerves (2 prominent). Bk. long, broad or narrow, rough or only slightly scabrid, deeply bifid, legs smooth inside. Nut ovate or obovate, narrowed below. Stig. 3. June. (See *B. and S.*, 408, fig. 426).

59. C. PUNCTATA Gaud.

A rare sedge found only on marshes or wet rocks near the sea in 11 v.-cs. June. St. 1-2 ft., slender, smooth, leafy below—resembling *C. distans* but easily distinguished by its fruits. Ls. shorter, 2-5 mm. wide, flat, pale green, grass-like and shortly acuminate, the uppermost lf.-sheath truncate and appendiculate in front with a long ligule at the back. Sp. 4-5; terminal sp. M. about an inch long, narrow, ends tapering. shortly stalked; lateral (3-4) oblong. F., erect. ⅜ in.-1 in. long, dense—the upper contiguous, the lower distant and stalked, erect. Br. with long sheaths, leafy, longer or shorter than st. Gl. ovate, pale. *obtuse*, mucronate or shortly awned—the mucro scabrid. (cf. the gl. of *C. binervis*, *B. and S.*, fig. 425 C.). Fr. much exceeding the gl., spreading, ovate very inflated at the middle. 3-3½ mm., shining, *minutely pellucidly punctate*. Bk. slender, linear, smooth, bifid. Nut very similar to that of *C. Hostiana*, ovate or obovate, narrowed below, brown, filling about ⅔ of the fr. Stig. 3. (The fruit in *Fitch*, 1146, is too narrow in the middle).

60. C. DISTANS L.

A common sedge near the sea in marshes, or wet meadows and upon wet rocks. May, June. St. 1-2 ft., rigid, leafy at the base. Ls. much shorter, 2-5 mm. wide, spreading, flat, rigid, longly tapering above, grey-green. Sp. 4, distant: terminal sp. M. up to 1 in. long; lateral (3) F., usually less than 1 in. (2-3 cm., Coste), ± erect, shortly stalked or the topmost sessile. Br. sheathing, long or short, leafy. Gl. broadly ovate, mucronate. Fr. about 4 mm. long (rarely 5 mm.), exceeding the gl., elliptical, often faintly punctate, equally and many-ribbed, base sub-rotund. Bk. ± long, bifid rough outside and inside the notch, the roughness often coming well down on the shoulders. Nut often nearly filling the fr., elliptical, with a short bk. and narrowed below, faces concave. Stig. 3. (See *B. and S.*, 406, fig. 424).

61. C. BINERVIS Smith.

A common plant of heaths, moors and cliffs. Widely distributed but scarce on calcareous soils. It is, however, sometimes found in limestone grassland associations. June, July. St. 1-3 ft., rigid, smooth, angles obtuse. Ls. much shorter, widely spreading, 3-6 mm. wide, flat, rigid and tapering gradually to the apex, with an oblong ligule opposite the limb. Sp. 4-5 distant; terminal sp. M., ± 1 in. long; lateral (3-4) F., shortly cylindrical, many-flowered, topmost sessile, the others shortly stalked, ± erect; lowest may be drooping, on a longer stalk, and composite. Br. longly sheathing, short except the lowest. Gl. ovate, narrow, obtuse (or even truncate), dark, with an excurrent mucro (fig. 425 C.) as in *C. punctata*. Fr. longer than gl., broadly elliptical, swollen in the middle and tapering to each end (as in *punctata*), about 4 mm. long, ultimately very dark and showing up the two marginal green nerves which give the plant its name. Bk. long, ± broad and flattened, rather deeply bidentate, scabrid or ciliate at the edges and slightly scabrous inside the notch. Nut much smaller than fr., obovate, narrowed below and with a short erect bk. Stig. 3. (See *B. and S.*, 407, fig. 425, A. B. C.).

Var. ALPINA Drejer (*C. Sadleri* Linton. *C. frigida* Syme).

Recorded only for 6 v.-cs. in Scotland on mountain rocks or sea-cliffs, common in Clova corries. August. Much smaller (3 in.-12 in.) than the type in most of its characters. Sp. shorter, fusiform, topmost sessile, lowest long-stalked and pendulous. Br. sheathing, foliaceous. Gl. acute. Fr. narrower, lanceolate with less prominent marginal nerves and longer bk., bifid and rough. Ls. less obviously tapering. Much later in fruit than the type. Nut ovate.

62. C. EXTENSA Good.

Locally common only near the sea, among the grass of salt-marshes or estuaries. Easily recognised by its habitat and its very long and widely spreading bracts—the Long-bracted Sedge. June. St. about a foot high, slender, smooth and leafy below the middle. Ls. narrow, pale green, 2 mm. or less, rigid, canaliculate. Sp. 3-5; terminal sp. M., linear-oblong or fusiform, small (⅜ in.-¾ in.); lateral (2-4) F., ovate, (8-15 mm.), shorter than the M. sp. and close to it, or the lowest remote. Bracts very long and narrow, widely divaricate with short sheaths or none. Gl. broadly ovate, 3-nerved, mucronate. Fr. ovate or elliptical, narrowed below, about 3 mm. long, with many nerves and purplish dots. Bk. short, broad, smooth, bifid. Nut nearly filling the fr., short ovate or elliptical, olive-brown. Stig. 3. (*Fitch*, fig. 1143).

63. C. OEDERI Retz.

This species shows a decided preference for sandy or gravelly habitats near lakes, streams and fens, or in sand-dune slacks. It is much smaller in all its parts than *C. flava* and usually from 3 in.-6 in. high, but varies greatly. Its tallest form (*elatior* Anderss.) reaches a foot or more in height, but *C. flava* may be 2 ft. 8 in. high. Ls. grass-like, rigid, much narrower (2-3 mm.) than those of *flava*. Sp. 3-4; terminal sp. M.; lateral (2-3) F., small, globose, approximate—as in most species of Carex, there is occasionally a lowest sp. rather distant and ± stalked. Fr. orbicular-obovate, small, 2-3 mm. (*flava*, 5-6 mm.), about half the size of those of *C. flava*, and more numerous. Suddenly contracted at the apex into a short straight bifid beak, rough outside. Gl. oval or ovate, obtuse or sub-acute, not mucronate, and slightly shorter than the fr. Nut obovate, nearly as wide as long, very swollen and truncate at the top. Stig. 3. June, July. (See *B. and S.*, 409, fig. 427).

64. C. FLAVA L.

Common, and recorded for all the divisions of the British Isles. Like the preceding and following species—very variable, and with named varieties and forms too numerous to mention. St. 8 in. to 2 ft. 8 in. (Roudsea Wood, N. Lancs. !), slender, smooth and usually trigonous. Ls. usually shorter than, but may exceed, the stem, 3-5 mm. wide, flat, rich green—golden yellow when dried. Br. leafy, prominent, divergent or reflexed, shortly sheathing, often exceeding the st. Sp. 3-4; terminal sp. M., cylindrical, narrow, to ¾ in. long, sessile or shortly stalked; fertile sp. (2-3), roundish-oval, shortly cylindrical, ovate or even subglobose ⅜ in.-⅝ in. (1-1½ cm.), approximate or the lowest distinct with a nearly included stalk. Gl. brown, *much* shorter than the fr. (cf. *Oederi*), lanceolate-ovate sub-acute or sometimes very gradually tapering to a ciliate acute apex. Fr. very much exceeding the gl.—often more than twice as long—spreading widely, ovate, inflated, 5-6 mm. long, strongly ribbed, base attenuate, more gradually tapered above to a long, rough, bifid beak, often (by no means always) obliquely deflexed and sometimes noticeably arcuate and strongly ciliate (Roudsea Wood !). Nut obovate, trigonous, punctate. Stig. 3. June.

65. C. LEPIDOCARPA Tausch.

In both the Oxford List and L.C. this is given as a species. Our own opinion is that 63, 64 and 65 are merely ecological modifications of one species. The chief distinctions of *C. lepidocarpa* are (1) male spikelet conspicuously pedunculate. (2) Female spikelets distant. The st. is usually over a foot high and the ls. intensely green. The fertile spikelets are distant, ovate or oblong. The fr. crowded, suborbicular, intermediate in size between *flava* and *Oederi*—about 4 mm. long. The bk. is long and usually deflexed only in the lower part of some of the spikelets. The fr. is often curved and the lowest spikelet sometimes below the middle of the st. Otherwise as in *C. flava*.

66. C. PSEUDO-CYPERUS L.

One of the most beautiful British sedges, not common, but locally plentiful near slowly moving or stationary water—sides of ditches, ponds, canals—or the stagnant water of marshy places in woods; often on limestone. June. St. 1-2½ ft., stout with very rough angles. Ls. exceeding the st., wide (5-9 mm.), light green with long sheaths. Sp. 4-6; M. sp. 1½ in.-2½ in. long, stalked and bracteate; F sp. 3-5, cylindric, to 2¼ in. long, rather close or the lowest remote, all with long rough setaceous stalks finally pendulous and graceful. Bracts leafy longer than the st., the lowest ± sheathing. Gl. small, lanceolate, very narrow ending in a very long rough excurrent awn. Fr. longer and broader than the gl. —or subequal in length (not as in *Fitch*, 1153), ovate-lanceolate, slender, spreading or deflexed, shining, many-ribbed and about 5 mm. long. Bk. very long—often one-third the length of the fr.—deeply split and with very pointed teeth, usually smooth. Nut much shorter than fr., pale, oval, trigonous. Stig. 3, short.

67. C. ROSTRATA Stokes in With. (*C. ampullacea* Good.: *C. inflata* Sut. *Fl. Helv.* II (1802), 265, non Huds. (as in *L.C.*, 2089).

Common in very wet bogs and on the margins of lakes or pools. June. Stem normally 1-2 ft., stout, *angles obtuse, smooth.* Ls. narrow (2-4 mm.), margins often involute, longly tapering, glaucous, rigid. M. sp. 2-3 (rarely 1), linear, sub-contiguous, lowest with a setaceous bract. F. sp. 2-3, oblong-cylindric, remote, to 2 in. long, *topmost usually shortly stalked, lowest with long stalks—the stalks smooth.* Bracts leafy, exceeding the stem. Gl. oblong, subacute. Fr. yellow, longer and broader than the gl., *orbicular-ovate* with rounded base, *suddenly contracted apex,* and *long, slender,* smooth bifid beak. Fr. much smaller (4-5 mm.) than in *C. vesicaria* (6-9 mm.). It is shining, glabrous, with many nerves and widely spreading. The nut is much smaller and usually obovate. Stig. 3, short. This species is commonly confused with *C. vesicaria*, even by experienced botanists who too often rely mainly upon the difference in the beaks of the respective fruits. This is a most valuable character —in conjunction with others—but very frequently is quite useless alone. The chief differences between the two species are italicised in the descriptions, but may be briefly summarised here. *C. vesicaria* is normally a taller plant with broader ls. and larger fruits. The angles of its st. are acute and always rough above. Its topmost F. sp. is usually sessile and its lowest only shortly stalked, the stalks being slightly rough. Even many of these characters, however, are shared by luxuriant examples of *C. rostrata* as the following description of one of its varieties will show.

Var. UTRICULATA (Boott) Bailey.

Stem from 3-4 ft. high, with the top of the st. often slightly rough. Ls. much broader (4-9 mm.) and flat. F. sp. very much larger and fr. as large as those of *C. vesicaria.* Gl. more acute and often even with a scabrid awn. Recorded for Ireland chiefly, but should be found in Britain.

68. C. VESICARIA L.

Scarcely so widely distributed as the preceding but locally common on the margins of lakes, in marshes or along river-banks and dykes. Slightly earlier in fruit. In normal cases easy to recognise by its *large yellowish gradually tapering fruits* but even these are simulated by some forms of *C. rostrata.* St. 1-3½ ft. with *acute angles rough above.* Ls. about equalling the stem, 4-8 mm. wide, flat, rather rigid. M. sp. 2-3, linear, often over 2 in. long, approximate, lowest with a setaceous bract. F. sp. 2-3, oblong-cylindric, remote, to 2¾ in. long—slightly *longer and thicker* than those of *C. rostrata—topmost sessile, the rest with short slightly rough stalks.* Bracts leafy, exceeding the stem. Gl. narrowly lanceolate, *acuminate.* Fr. longer and broader than the gl., *ovate-conic* with rounded base and *gradually tapering apex* and a *rather stouter* smooth bifid beak. Fr. much larger (6-9 mm.) than in *C. rostrata* (4-5 mm.). They are shining, glabrous, with many nerves and obliquely spreading, *yellowish.* Nut rather small and normally *oval.* Stig. 3, short.

69. C. GRAHAMI Boott.

A very rare species known in Britain only from alpine bogs on high mountains in two Scottish v.-cs. Considered by Hook. (464) to be a subspecies, and by Kük. (727) to be a variety—of *C. vesicaria.* It is smaller than that species and only 1-2 ft. in height. Ls. narrow. M. sp. 1-2, oblong, slender, acute; F. sp. 2-3 oblong, ovate, blunt, about ¾ in. long, the lower 1-2 rather distant, stalked. Br. leafy without sheaths. Gl. small, ovate, blunt or acute, dark with midrib and apex pale. Fr. nearly twice as long as the gl., ovate, much smaller and darker than in *C. vesicaria,* inflated, strongly ribbed, narrowed into a short, slightly bifid bk. Nut small, elliptical, beaked. Stig. 2 or 3. July. (See *B. and S.*, 411, fig. 429).

70. C. SAXATILIS L. (*C. pulla* Good.).

Not so rare as the preceding, but confined to similar habitats on the wet parts of the higher Scottish mountains. Considered by Kükenthal (727) as a sub-species of *C. vesicaria.* Very small (6 in.-12 in.), and often rather decumbent at the base and leafy. M. sp. 1-2, small, fusiform and sub-clavate. F. sp. 1-2 (3) ovate, or oblong-ovate, dark brown, the upper sessile the lowest shortly stalked and with a short leafy bract at its base. Gl. blackish-brown or dark purple, ovate, shorter than the fr., subacute. Fr. ovate, 3-3½ mm. long (cf. *vesicaria*), inflated, very dark and obscurely veined. Bk. short, emarginate. Stig. 2, rarely 3. July.

71. C. ACUTIFORMIS Ehrh. (*C. paludosa* Good.).

Common in marshes and along the margins of rivers, ponds and streams. May, June. St. 2-3½ ft., stout with very rough acute angles. Ls. about equalling the st., broad (normally 5-8 mm., but sometimes nearly ½ in. wide), flat and glaucous. Sp. 5-7; upper 2-3 M., stout, contiguous, to 1½ in. or more in length, dark brown. The others F., cylindric, 1¼ in.-2¾ in. in length, dark, the upper usually sessile the lower shortly stalked—all erect. Br. erect, long (lowest exceeding the st.), leafy not sheathing. Gl. oblong, ovate or lanceolate, reddish with green keel and apex entire or lacerate with an excurrent rough mucro or awn. Fr. slightly exceeding the gl. but broader, ovate or oblong-ovate, about 4 mm. long, many-ribbed, glabrous, ± granulose, stipitate. Bk. short, rather deeply bifid or only emarginate, often rough. Nut smaller, obovate, trigonous. Stig. 3, rarely 2.

72. C. RIPARIA Curtis.

Common on the sides of rivers, canals, streams and ditches in the south, but much less frequent in the north. Shares with *C. pendula* the distinction of being one of the largest British sedges. St. 2-5 ft. high, stout with very rough angles above and very long and broad ls., equalling or exceeding the st., and often over ½ in. (6-15 mm.) wide. Sp. very large and numerous. M. sp. 3-6 crowded, to 2⅝ in. long; F. sp. 4-6, cylindrical, upper ± remote, nearly sessile or shortly stalked, lowest distant inclined or pendulous on long, stout, smooth stalks, the longest sp. up to 3½ in. long. Br. leafy, broad, the lowest shortly sheathing and exceeding the st. Gl. narrow, lanceolate, apex lacerate and with a long rough awn (M. gl. acuminate). Fr. equalling or slightly exceeding the gl. ovate-conic or elliptic, 5-6 mm. long, glabrous, many-nerved, dull olive green or brown, rather inflated, with contracted base and apex narrowed into a short broad deeply bifid bk. Nut yellow, obovate or elliptic, faces slightly concave, stipitate, with a long beak, laxly included. Stig. 3. May, June. (See *B. and S.*, 410, fig. 428).

73. C. LASIOCARPA Ehrh. (*C. filiformis* Good.).

Rather widely distributed but locally common in some areas and absent or rare in others. Often met with in shallow water on the edges of reed-swamps in the English lakes, also in marshes, dykes and ditches elsewhere. Easily recognised by its hairy fruits. May, June. St. 2-3½ ft. high, slender but rigid, smooth or slightly scabrid above. Ls. shorter than the st., *very narrow* but stiff, channelled, septate, grey-green; sheaths large, red-brown with filamentous edges. Sp. 3-4 (6): M. sp. 1-3, *very slender*, 1 in.-2½ in. long: F. sp. 1-3, erect, oblong or ovate, from ⅜ in. to 1¼ in. long, remote, sessile or the lowest stalked. Br. leafy, the lowest filiform and often overtopping the st. Gl. lanceolate acuminate, chestnut-brown, margins narrowly concolorous. Fr. equalling or almost exceeding the gl., narrowly ovate, 4-5 mm. long, densely *greyish tomentose*, with contracted base. Bk. short and deeply bifid. Nut nearly filling the fr., ovate, 3-quetrous, stipitate. Stig. 3, long. (*Fitch*, fig. 1140). [a hybrid of 72 and 73, ×*C. evoluta* Hartm. (*C. riparia* × *lasiocarpa*), has been recorded from Somerset.]

74. C. HIRTA L.

A common sedge in damp copses, upon grassy banks, in wet meadows or damp sandy hollows. May, June. St. slender but firm, 1-2 ft., leafy, glabrous, shining. Ls. normally shorter, flat, hairy on both sides, soft, grass-like, usually 2-4 mm long (occasionally wider), with long hairy sheaths. Sp. rather numerous, 4-6 or even more. M. sp. 2-3, close, linear, ½ in.-1¼ in., pale, ± shining. F. sp. 2-3 (5), oblong or cylindric, remote, ¾ in.-1½ in. long—the lowest 1 or 2 with setaceous pilose stalks. Br. leafy, about equalling the st., the lowest longly sheathing. Gl. lanceolate-ovate, pale, gradually tapering to a long slender ciliate awn. Fr. exceeding the gl. erect, large (5-7 mm.), ovate-conic, hairy, many-ribbed, base rounded. Bk. long, deeply bifid with legs ± divergent and scabrous both outside and in the notch. Nut not filling the fr., obovate narrowed below, often stipitate. Stig. 3. (*Fitch*, fig. 1141).

I am greatly indebted to Dr G. Kükenthal for permission to use details from his invaluable monograph on this genus (*Pflanzenreich*, iv, 20) in compiling the foregoing descriptions. Any special value that attaches to them is that they are taken from my field note-book and have been modified from time to time as the result of the careful and exact examination of plants *in situ*. It is claimed for them that if they are gone through line by line with a normal plant in hand, it should be impossible to wrongly determine its species. On the other hand, plants may be found to which no single description applies. These may possibly be varieties or hybrids of species here described, and care should be taken to note and record the names of sedges growing in the immediate vicinity, and also particulars of the nature and situation of the habitat.

A practice strongly to be commended is that of devoting one day's field-work to the examination and collection of one genus only. This economises effort in carrying only the note-book of that genus instead of a much heavier and more bulky flora. Further, the concentration of attention only upon the species of one genus is by far the best means of comparing, contrasting, and noting their similarities or differences. and of impressing their distinctive characters upon the memory.

Most species of Carex vary considerably in height, as their habitat is congenial or not. As an example, *C. flava* is given in two floras as "seldom attaining a foot in height," and in Hooker's *Stu. Fl.* as from 3 in.-18 in. We have seen it growing to 32 in. under specially favourable conditions—a combination of shade, deep rich alluvium (frequently replenished by the flooding of an adjacent stream) mixed with the humus of long years' decay of surrounding sedges and the underlying rock being limestone. In this instance, therefore, as in some others, the measurements given herewith may not agree with those found elsewhere, but they have all been verified from specimens seen. Most species of Carex may be more or less scabrid at the top of the stem upon occasion, and this character is therefore of little value. They have, also, a tendency to produce a small additional spikelet very far down the stem.

We have not attempted to deal with the very large number of varieties given in current lists. To do so would have occupied far too much space and would have appealed only to critical botanists who usually have ample references on their own shelves. We shall be grateful to any members who have discovered a character of especial value in separating similar species if they will pool their knowledge for the general good, and send it for publication.

TUNBRIDGE WELLS NATURAL HISTORY SOCIETY.
BOTANICAL SECTION.

List of Plants found in Sussex during Botanical Rambles,
May-August 1932.

London Catalogue, 11th Edition.

9. ANEMONE NEMOROSA. Broadwater Forest, Eridge Park, abundant.
17. RANUNCULUS HETEROPHYLLUS. Broadwater Forest, Eridge Park, abundant.
18. R. PELTATUS. Broadwater Forest, Eridge Park, abundant.
26. R. SCELERATUS. Pevensey (rather sparingly).
28. R. FLAMMULA. Broadwater Forest, Eridge Park.
33. R. ACRIS. Broadwater Forest, Eridge Park.
34. R. REPENS. Broadwater Forest, Eridge Bridge.
35. R. BULBOSUS. Broadwater Forest, Eridge Park.
37. R. SARDOUS. Great Dancgate (abundant in a cornfield). Between Uckfield and Piltdown (sparingly). Buckhurst Park, near Fisher's Gate.
39. R. ARVENSIS. Between Uckfield and Piltdown.
41. R. FICARIA. High Rocks Lane, Eridge Park.
42. CALTHA PALUSTRIS. Dallington Forest (Cox's Mill Pond). Benhall Pond, Buckhurst Park.
57. NUPHAR LUTEA. Cuckmere at Berwick. Buckhurst Park.
59. NYMPHAEA ALBA. Pond by Pevensey Station.
61. PAPAVER SOMNIFERUM. Roadside weed at Westdean (V).
65. P. ARGEMONE. Roadside weed at Westdean (V).
68. GLAUCIUM FLAVUM. Cuckmere Estuary. Pevensey (V) (rather scarce).
70. CHELIDONIUM MAJUS. Roadside, Frant.
88. CHEIRANTHUS CHEIRI. Pevensey Castle walls.
89. NASTURTIUM OFFICINALE. Eridge Park.
    b. SIIFOLIUM. Cuckmere marshes (ditches).
90. N. SYLVESTRE. Broadwater Forest.
93. BARBAREA VULGARIS. Near Wadhurst Station.
104. CARDAMINE AMARA. High Rocks, Sprat's Bottom, Benhall Pond.
105. C. PRATENSIS. High Rocks, Eridge Park.
106. C. HIRSUTA. High Rocks Lane, Eridge Park.
107. C. FLEXUOSA. High Rocks Lane, Eridge Park.
109. C. BULBIFERA. High Rocks.
127. SISYMBRIUM THALIANUM. High Rocks Lane.
133. S. ALLIARIA. High Rocks Lane.

155. Lepidium ruderale. Pevensey (a few starved plants in station yard). C. Bailey says in profusion at Langley.
158. L. campestre. Weed in Charlton's Nursery. Piltdown, frequently.
160. L. Draba. High Rocks. Seaford (IV), plentiful.
170. Crambe maritima. Cuckmere estuary (V), sparingly.
175. Reseda lutea. Lewes.
179. Helianthemum Chamaecistus. Jevington.
184. Viola palustris. Broadwater Forest, Dallington Forest, Buckhurst Park. Marsh between Uckfield and Piltdown.
187. V. Riviniana. High Rocks Lane, Eridge Park.
190. V. lactea. Very sparingly on Nevill Golf Links, T. Wells.
196. V. lepida. Woods near Wadhurst Station.
197. V. agrestis. Cornfield at Great Danegate (to be confirmed).
207. Polygala vulgaris. Eridge Park. On and near Piltdown.
208. P. dubia. Broadwater Forest.
209. P. serpyllacea. Broadwater Forest, Eridge Park. Buckhurst Park.
213. Frankenia laevis. Cuckmere estuary (V), rarely.
223. Silene Cucubalus. Lewes (in a cornfield).
224. S. maritima. Pevensey (sparingly).
238. Lychnis alba. Lewes (in cornfield). Near Berwick Court (with pink flowers).
249. Cerastium viscosum. High Rocks Lane.
250. C. vulgatum. High Rocks Lane.
258. Stellaria media. High Rocks Lane, Eridge Park.
261. S. Holostea. High Rocks Lane, Eridge Park.
264. S. uliginosa. High Rocks Lane, Eridge Park.
269. Arenaria trinervia. High Rocks Lane, Eridge Park.
280. Sagina ciliata. Pevensey.
282. S. procumbens. Broadwater Forest.
289. Spergula vulgaris. Great Danegate (cornfield). Piltdown.
290. S. sativa. Between Sprat's Bottom and Mark Cross.
293. S. salina. Seaford and Cuckmere Haven.
294. S. marginata. Pevensey (plentiful).
298. Claytonia perfoliata. Near Groombridge.
299. c. Montia chondrosperma. Eridge Park
300. Tamarix gallica. Seaford (planted).
303. Hypericum Androsaemum. Dallington Forest (a few plants). Saxonbury wood (sparingly).
307. H. perforatum. Lewes.
312. H. humifusum. Piltdown, frequently.
315. H. hirsutum. Jevington.
317. H. elodes. Jevington, by pond, fairly common.
318. Althaea officinalis. Cuckmere Haven, near Exceat Bridge (abundant).
322. Malva moschata. Dallington Forest (one plant).
b. heterophylla. Benhall Pond (in field).
327. M. pusilla. Westdean (V), roadside weed.

338. GERANIUM VERSICOLOR. Piltdown (garden escape by pond).
340. G. PHAEUM. Crowborough.
344. G. MOLLE. Saxonbury Wood (sparingly).
347. G. DISSECTUM. High Rocks Lane. Between Uckfield and Piltdown. Seaford and Cuckmere Haven, frequently.
350. G. ROBERTIANUM. High Rocks Lane. Eridge Park.
352. ERODIUM CICUTARIUM. Seaford and Cuckmere (sparingly).
358. OXALIS ACETOSELLA. Broadwater Forest and Eridge.
363. IMPATIENS PARVIFLORA. Uckfield, abundantly in a wood just beyond the Rocks.
368. RHAMNUS FRANGULA. Dallington Forest (frequently). Saxonbury Wood (sparingly). South of Hawkenbury.
370. ACER CAMPESTRE. Eridge Park.
377. ULEX MINOR. Dallington Forest (rare). Piltdown, abundant.
378. CYTISUS SCOPARIUS var. ANDRAEANUS Puiss. Field near High Rocks.
379. ONONIS REPENS. Cuckmere Haven (frequently).
386. MEDICAGO LUPULINA. High Rocks Lane.
396. TRIFOLIUM PRATENSE. High Rocks Lane.
397. T. MEDIUM. Saxonbury Wood (common), Bayham (common).
412. T. FRAGIFERUM. Pevensey (plentiful).
416. T. DUBIUM. Broadwater Forest.
418. ANTHYLLIS VULNERARIA. Lewes.
420. LOTUS CORNICULATUS. High Rocks Lane and Eridge Park.
c. HIRSUTUS. Dallington, by lane to woods.
422. L. ULIGINOSUS (type). Dallington Woods. Piltdown.
b. GLABRIUSCULUS. Buckhurst Park. Type not seen.
436. VICIA TETRASPERMA. Piltdown, sparingly.
442. V. SEPIUM. Eridge Park.
447. V. ANGUSTIFOLIA. Eridge Park, High Rocks Lane.
454. LATHYRUS PRATENSIS. Near Frant Station and Wadhurst Station.
460. L. MONTANA. High Rocks Lane.
467. PRUNUS PADUS. High Rocks.
469. SPIRAEA ULMARIA. Witherenden Marshes.
b. DENUDATA. Witherenden Marshes.
470. S. FILIPENDULA. Lewes.
596. FRAGARIA VESCA. High Rocks Lane, Eridge Park.
599. POTENTILLA STERILIS. High Rocks Lane, Eridge Park.
602. P. ERECTA. Broadwater Forest. Eridge Park.
604. P. REPTANS. Broadwater Forest. Eridge Park.
605. P. ANSERINA. Broadwater Forest.
613. ALCHEMILLA ARVENSIS. Broadwater Forest.
628. AGRIMONIA ODORATA. By Shornmead Wood.
629. POTERIUM SANGUISORBA. Lewes (common).
672. ROSA MICRANTHA. Uckfield—by a pond just beyond the Rocks.
686. SORBUS TORMINALIS. South of Hawkenbury (one tree).
692. CRATAEGUS MONOGYNA. Broadwater Forest and Eridge Park.
718. CHRYSOSPLENIUM OPPOSITIFOLIUM. Broadwater Forest and Eridge Park, Sprat's Bottom.

723. Ribes rubrum. Broadwater Forest and Eridge Park.
738. Sedum reflexum. Great Danegate (outside a garden).
741. Drosera rotundifolia. Ashdown Forest.
743. D. longifolia. Ashdown Forest.
745. Myriophyllum verticillatum. Eridge Park.
746. M. spicatum. Piltdown—in pond but in small quantity.
749. Callitriche stagnalis. Broadwater Forest.
751. C. intermedia. Eridge Park.
752. C. obtusangula. Ditches at Pevensey, frequently.
755. Peplis Portula. Piltdown—in and by the pond.
756. Lythrum Salicaria. River at Berwick.
758. Epilobium angustifolium. Broadwater Forest.
759. E. hirsutum. Eridge Park.
760. E. parviflorum. Eridge Park. Buckhurst Park.
761. E. montanum. Eridge Park.
766. E. obscurum. Eridge Park.
768. E. palustre. Pevensey. Benhall Pond. Buckhurst Park (in boggy places).
776. Circaea lutetiana. Broadwater Forest. Eridge Park.
778. Bryonia dioica. Lewes (rare). Cuckmere Haven (V).
779. Hydrocotyle vulgaris. Eridge Park.
783. Sanicula europaea. Eridge Park.
785. Conium maculatum. Between Uckfield and Piltdown, by stream.
793. Apium nodiflorum. Berwick Marshes.
795. A. inundatum. Piltdown—in a pond, in plenty.
802. Sison Amomum. Seaford.
806. Aegopodium Podagraria. Broadwater Forest.
807. Pimpinella Saxifraga. Bayham (very common.).
    c. dissecta. Seaford.
809. Conopodium majus. High Rocks Lane.
813. Scandix Pecten-Veneris. Lewes Downs.
815. Anthriscus sylvestris. Broadwater Forest. Eridge Park.
819. Crithmum maritimum. Cuckmere—one plant on west of river.
820. Oenanthe fistulosa. Ditch near Pevensey. Also a form at Berwick with 3-7 rays (not *Lachenalii*).
825. O. aquatica. High Rocks.
827. Aethusa Cynapium. Berwick Court (V), plentiful in cultivated fields.
829. Silaus flavescens. Great Danegate—sparingly.
833. Angelica sylvestris. High Rocks Lane. Eridge Park.
838. Peucedanum sativum. Lewes (locally frequent).
839. Heracleum Sphondylium. High Rocks Lane. Eridge Park.
846. Caucalis arvensis. Berwick Court (IV).
847. C. Anthriscus. Lewes.
848. C. nodosa. Lewes, Pevensey.
849. Hedera Helix. Broadwater Forest. Eridge Park.
851. Cornus sanguinea. Lewes (one tree).
853. Sambucus nigra. Broadwater Forest. Eridge Park.

855. VIBURNUM OPULUS. Broadwater Forest. Dallington Forest. South of Hawkenbury and roadside at Frant field.

856. V. LANTANA. Lewes (one tree).

859. LONICERA PERICLYMENUM. Broadwater Forest. Eridge Park.

863. GALIUM CRUCIATA. Broadwater Forest. Uckfield. Abundant in a marshy field west of the rocks.

864. G. VERUM. Broadwater Forest, in small quantity.

866. G. MOLLUGO. Dallington Woods (by Mill Pond only).

867. G. SAXATILE. Broadwater Forest. Eridge Park.

869. G. PALUSTRE. Piltdown abundant by the pond. As elsewhere, a slightly scabrous form prevails—not var. *Witheringii* which is very scabrid.

b. LANCEOLATUM. Piltdown by the pond, mixed with the type but much larger.

873. G. APARINE. High Rocks Lane. Eridge Park.

877. ASPERULA CYNANCHICA. Lewes (common).

879. SHERARDIA ARVENSIS. Lewes (in cornfield).

880. VALERIANA DIOICA. High Rocks Lane.

882. V. SAMBUCIFOLIA. Sprat's Bottom.

890. VALERIANELLA DENTATA. Between Uckfield and Piltdown in small quantity. Lewes (in cornfield).

891. DIPSACUS SYLVESTRIS. Saxonbury Woods (rare). Pevensey and Berwick Marshes.

894. SCABIOSA COLUMBARIA. Lewes.

895. S. ARVENSIS. Between Uckfield and Piltdown (a field full).

897. EUPATORIUM CANNABINUM. Sprat's Bottom, Cuckmere at Berwick.

898. SOLIDAGO VIRGAUREA. Broadwater Forest. Eridge Park.

902. ASTER TRIPOLIUM. Pevensey, dwarf forms sparingly.

921. INULA SQUARROSA. Lewes (frequently).

925. PULICARIA DYSENTERICA. Pevensey.

927. BIDENS CERNUA. Near Pevensey, rare.

931. ACHILLEA PTARMICA. Near Lyes Green.

935. ANTHEMIS ARVENSIS. Great Danegate. Cornfield between Uckfield and Piltdown.

936. A. NOBILIS. On Piltdown.

938. CHRYSANTHEMUM LEUCANTHEMUM. Eridge Park. High Rocks Lane.

939. C. PARTHENIUM. Various places in and near Uckfield and Piltdown.

940. b. MATRICARIA MARITIMA. Cuckmere Haven and Seaford.

942. M. DISCOIDEA. Roadsides near farms, frequently.

944. TANACETUM VULGARE. Below Benhall Pond (X).

948. ARTEMISIA MARITIMA. Shore E. of Pevensey, plentiful. Seaford and Cuckmere Haven (common).

b. GALLICA. Seaford and Cuckmere Haven (not so common).

950. TUSSILAGO FARFARA. High Rocks.

951. PETASITES FRAGRANS. Roadside near E. Blatchington (IV).

952. P. OVATUS. Below Benhall Mill Pond.

959. SENECIO VISCOSUS. Pevensey (common).
961. S. ERUCIFOLIUS. Near Lyes Green.
970. CARLINA VULGARIS. Lewes, frequently.
976. CARDUUS NUTANS. Lewes, frequently.
977. C. CRISPUS. Roadside at Westdean, probably quite common.
978. CNICUS LANCEOLATUS. Eridge Park. Broadwater Forest.
980. C. PALUSTRIS. Eridge Park. Broadwater Forest.
982. C. PRATENSIS. Between Uckfield and Piltdown—rare.
984. C. ACAULIS. Lewes.
985. C. ARVENSIS. Eridge Park. Broadwater Forest.
989. SERRATULA TINCTORIA. Dallington Woods. Plenty by lane in one place. South of Hawkenbury and Benhall Lane.
1001. CENTAUREA SCABIOSA. Lewes.
1009. LAPSANA COMMUNIS. Broadwater Forest, common.
1011. CREPIS FOETIDA. Pevensey—locally plentiful on shingle.
1013. C. TARAXACIFOLIA. Between Uckfield and Piltdown, common.
1277. TARAXACUM PALUDOSUM. Eridge Park.
1282. LACTUCA MURALIS. Broadwater Forest. Frant.
1286. b. SONCHUS GLABRESCENS. Turnip field at Berwick Court (V), plentiful.
1289. TRAGOPOGON MINUS. Lane near Mark Cross. Pevensey—rare.
1289. WAHLENBERGIA HEDERACEA. Ashdown Forest.
1296. PHYTEUMA ORBICULARE. Lewes, frequently.
1298. CAMPANULA GLOMERATA. Lewes.
1306. LEGOUSIA HYBRIDA. Lewes.
1309. VACCINIUM MYRTILLUS. Eridge Park. Dallington Forest. Sprat's Bottom.
1315. CALLUNA VULGARIS. Eridge Park. Broadwater Forest. Ashdown Forest.
1317. ERICA TETRALIX. Eridge Park. Broadwater Forest. Ashdown Forest.
1319. E. CINEREA. Eridge Park. Broadwater Forest. Ashdown Forest.
Var. SCHIZOPETALA. Crowborough Golf Links.
1332. LIMONIUM VULGARE. Shore east of Pevensey (not very common). Cuckmere Haven—probably common.
1339. ARMERIA MARITIMA. Shore east of Pevensey (not very common). Cuckmere Haven, common.
1342. HOTTONIA PALUSTRIS. Berwick Marshes.
1353. LYSIMACHIA NUMMULARIA. Saxonbury Hill.
1354. L. NEMORUM. Broadwater Forest.
1356. GLAUX MARITIMA. Shore east of Pevensey, very common. Seaford and Cuckmere Haven, probably common.
1359. ANAGALLIS TENELLA. Ashdown Forest.
1367. BLACKSTONIA PERFOLIATA. Lewes.
1389. CYNOGLOSSUM OFFICINALE. Near Cuckmere Haven (a plant or two).
1392. SYMPHYTUM OFFICINALE. Eridge Park. High Rocks. Near Mark Cross. Roadside by Frant field.
1395. S. TUBEROSUM. Junction of Forest Road and Bayham Road.

1404. Myosotis caespitosa. Mill Pond. (Dallington Forest).
1405. M. palustris. Mill Pond.
1408. M. sylvatica. Eridge Park.
1409. M. arvensis. Eridge Park.
1411. M. versicolor. Fields near Dallington Forest (occasionally). Piltdown, frequently.
1419. b. Convolvulus linearifolius. Turnip field, Berwick Court.
1421. Cuscuta Epithymum. Ashdown Forest. Near Frant field.
1422. C. Trifolii. Ashdown Forest.
1423. b. Solanum marinum. Shore east of Pevensey.
1430. Verbascum Thapsus. Dallington Forest—one plant.
1437. Linaria Elatine. Turnip field, Berwick Court—rarely.
1438. L. spuria. Turnip field, Berwick Court (frequently).
1447. Scrophularia aquatica. Eridge Park. Piltdown. Pevensey.
1449. S. nodosa. Eridge Park. Broadwater Forest.
1455. Digitalis purpurea. Eridge Park. Broadwater Forest.
1456. Veronica hederaefolia. High Rocks Lane.
1457. V. polita. Turnip field, Berwick Court.
1459. V. persica. Broadwater Forest. Eridge Park.
1465. V. serpyllifolia. Broadwater Forest. Eridge Park.
1472. V. Chamaedrys. High Rocks Lane. Eridge Park, etc.
1473. V. montana. High Rocks Lane. Eridge Park, etc.
1474. V. scutellata. Sparingly by Mill Pond. Between Uckfield and Piltdown sparingly in the marsh, plentiful on pond margin. Benhall Pond.
1475. V. Anagallis-aquatica. Eridge Park. Bayham Abbey—sparingly.
1476. V. Beccabunga. High Rocks Lane.
1481. Euphrasia nemorosa. Lewes—common.
1491. E. anglica. Piltdown.
1499. Pedicularis palustris. Ashdown Forest.
1500. P. sylvatica. Field by railway bank, High Rocks. Eridge Park.
1511. Melampyrum pratense. Dallington Forest. Sprat's Bottom—sparingly. Near Piltdown (under type).
1532. Pinguicula vulgaris. Ashdown Forest. Miss E. M. Harding. N.C.R.
1536. Verbena officinalis. Lewes.
1543. Mentha aquatica. Benhall Pond.
× arvensis. Benhall Pond.
1549. Lycopus europaeus. Eridge Park.
1550. Origanum vulgare. Lewes. Buckhurst Park (one large plant near Fisher's Gate).
1553. Clinopodium vulgare. Bayham Abbey.
1554. Calamintha Acinos. Lewes.
1560. Salvia horminoides. Seaford (IV), plentiful.
1565. Nepeta hederacea. Broadwater Forest. Eridge Park.
1566. Scutellaria galericulata. Eridge Park. Benhall Pond.

1567. S. MINOR. Ashdown Forest. Buckhurst Park (frequently). Benhall Pond.
1572. STACHYS OFFICINALIS. Benhall Lane (with white flowers).
1574. S. PALUSTRIS. Benhall Pond.
Var. CANESCENS. Lewes.
1575. S. SYLVATICA. Broadwater Forest.
1577. S. ARVENSIS. Buckhurst Park (a plant or two near Fisher's Gate).
1580. GALEOPSIS ANGUSTIFOLIA. Bayham Abbey—plentiful. Var. b. not seen.
1588. LAMIUM PURPUREUM. High Rocks Lane.
1590. L. ALBUM. High Rocks Lane.
1591. L. GALEOBDOLON. High Rocks Lane. Eridge Park.
1592. L. NIGRA. Lewes.
1598. AJUGA REPTANS. Broadwater Forest. Eridge Park.
1605. PLANTAGO CORONOPUS. Shore east of Pevensey.
1606. P. MARITIMA. Shore east of Pevensey, very common.
1607. P. LANCEOLATA. High Rocks Lane. Eridge Park.
1609. P. MEDIA. Lewes.
1621. CHENOPODIUM POLYSPERMUM. By Shoesmith Wood, abundant in bean field, type only.
1626. CHENOPODIUM FICIFOLIUM. Berwick Court (V), a turnip field full.
1632. C. RUBRUM. Bayham Abbey. Benhall Pond (manure heap). Seaford and Cuckmere Haven (occasionally in turnip fields).
1635. C. BONUS-HENRICUS. Pevensey Castle.
1637. BETA MARITIMA. Pevensey—sparingly.
1644. ATRIPLEX PORTULACOIDES. Pevensey—sparingly.
1649. SALICORNIA STRICTA. Pevensey, frequently as an aggregate.
1656. SUAEDA MARITIMA. Pevensey, common.
1659. b. POLYGONUM SUBULATUM. Berwick Court. Common in turnip field.
1661. P. HETEROPHYLLUM. Lewes.
d. RURIVAGUM. Buckhurst Park. Seems to be prevailing form in stubbles near Fisher's Gate.
1684. RUMEX PULCHER. Pevensey, apparently not common.
1690. R. HYDROLAPATHUM. Cuckmere Marshes.
1702. VISCUM ALBUM. Eridge Park on Maple and Poplar.
1703. THESIUM HUMIFUSUM. Lewes—rare.
1705. EUPHORBIA HELIOSCOPIA. Lewes—cornfield.
1712. E. AMYGDALOIDES. Broadwater Forest. Eridge Park. Dallington Forest. Saxonbury Woods. Benhall Lane. Buckhurst Park—sparingly near Lyes Green.
1719. E. EXIGUA. Lewes—cornfield. Seaford and Cuckmere Haven (IV and V). Cultivated fields—often with truncate leaves, but hardly var. *retusa*.
1720. E. LATHYRIS. Eridge Park.
1722. MERCURIALIS PERENNIS. Broadwater Forest.
1723. M. ANNUA. Lewes. Seaford and Cuckmere Haven, frequently.

1734. MYRICA GALE. Frant field, in plenty.
1741. CORYLUS AVELLANA. Broadwater Forest. Eridge Park, etc.
1742. QUERCUS ROBUR. Broadwater Forest. Eridge Park, etc.
1746. CASTANEA SATIVA. Broadwater Forest. Eridge Park, etc.
1747. FAGUS SYLVATICA. Broadwater Forest. Eridge Park, etc.
1749. SALIX TRIANDRA. Witherenden Marshes—at and below the bridge.
1750. S. FRAGILIS. Eridge Park.
1751. S. ALBA. Broadwater Forest.
1755. S. VIMINALIS. Broadwater Forest.
1759. S. AURITA. Broadwater Forest. Eridge Park. Dallington Forest.
1760. S. CAPREA. Broadwater Forest. Eridge Park. Great Danegate —apparently rare.
1761. S. CINEREA. Broadwater Forest. Eridge Park.
1762. S. REPENS. Broadwater Forest. Eridge Park.
1772. POPULUS TREMULA. Dallington Forest, both varieties.
b. VILLOSA. Bayham Abbey, frequently, type not observed.
1777. ELODEA CANADENSIS. Piltdown, in pond.
1779. HYDROCHARIS MORSUS-RANAE. Pevensey, common.
1784. NEOTTIA NIDUS-AVIS. Wadhurst.
1786. LISTERA OVATA. Broadwater Forest.
1797. EPIPACTIS LATIFOLIA. Buckhurst Park (three specimens seen in the Park towards Lyes Green).
1798. E. PURPURATA. Buckhurst Park (to be verified).
1800. ANACAMPTIS PYRAMIDALIS. Piltdown—a single plant by roadside on the common. Lewes.
1806. ORCHIS MORIO. Eridge Park and elsewhere.
1826. PLATANTHERA BIFOLIA. Dallington—rare.
1831. IRIS PSEUDACORUS. Eridge Park.
1853. POLYGONATUM MULTIFLORUM. Eridge Park.
1868. ALLIUM URSINUM. High Rocks.
1872. SCILLA NON-SCRIPTA. Broadwater Forest. Eridge Park.
1883. NARTHECIUM OSSIFRAGUM. Ashdown Forest.
1888. JUNCUS SQUARROSUS. Broadwater Forest.
1890. JUNCUS GERARDI. Pevensey—common.
1891. JUNCUS TENUIS. For many yards along lane to Cox's Mill Pond.
1909. LUZULA FORSTERI. Broadwater Forest. Eridge Park.
1910. L. PILOSA. Broadwater Forest. Eridge Park.
1911. L. SYLVATICA. Below Cox's Mill Pond. Sprat's Bottom.
1914. L. CAMPESTRIS. Broadwater Forest. Eridge Park.
1915. L. MULTIFLORA. Broadwater Forest. Eridge Park.
b. CONGESTA. Dallington Forest, in lane—probably very common.
1917. TYPHA LATIFOLIA. Cox's Mill Pond.
1918. T. ANGUSTIFOLIA. Eridge Park.
1919. SPARGANIUM RAMOSUM. Pevensey.
1920. S. NEGLECTUM. Piltdown (in the pond). Buckhurst Park—the only species.
1924. ARUM MACULATUM. High Rocks Lane. Eridge Park.
1928. LEMNA TRISULCA. Pevensey and Cuckmere.

1929. L. MINOR. Eridge (pond opposite Inn).

1930. L. GIBBA. Pevensey.

1931. L. POLYRRHIZA. Cuckmere at Berwick.

1933. ALISMA PLANTAGO-AQUATICA. Broadwater Forest. Eridge Park. Piltdown by pond (sparingly). Seaford and Cuckmere, frequently.

1937. SAGITTARIA SAGITTIFOLIA. Pevensey, very common.

1940. BUTOMUS UMBELLATUS. Pevensey—rather common.

1942. TRIGLOCHIN MARITIMUM. Pevensey, common. Cuckmere Estuary, plentiful.

1944. POTAMOGETON NATANS. Eridge. In and below Cox's Mill Pond Pevensey—common.

1945. P. POLYGONIFOLIUS. Eridge.

1960. P. DENSUS. Lewes (pond between downs).

1973. RUPPIA MARITIMA. Cuckmere, fruiting 13/9/1932.

1974. R. ROSTELLATA. Cuckmere, fruiting 13/9/1932.

1988. ELEOCHARIS PALUSTRIS. Frant Common.

1992. SCIRPUS CAESPITOSUS. Ashdown Forest

1994. S. FLUITANS. Piltdown—in pond plentifully.

1996. S. SETACEUS. Dallington Forest—in small quantity by damp lane sides. Between Piltdown and Uckfield—sparingly.

2002. S. MARITIMUS. Cuckmere Estuary, frequently.

2003. S. SYLVATICUS. Dallington Forest, in one place below mill pond. Cuckmere at Berwick. Buckhurst Park, in boggy places.

2008. ERIOPHORUM ANGUSTIFOLIUM. Ashdown Forest.

2009. E. LATIFOLIUM. Broadwater Forest.

2019. CAREX PULICARIS. Broadwater Forest.

2030. C. PANICULATA. Eridge Park. Buckhurst Park (a variety with sub-simple spikes, apparently rare).

2031. C. VULPINA. Saxonbury Woods and Sprat's Bottom—sparingly. Pevensey—rather frequently.

2033. C. CONTIGUA. Lane between Mark Cross and Sprat's Bottom (apparently rare).

2035. C. DIVULSA. Broadwater Forest. Saxonbury Woods and Sprat's Bottom, frequently. Piltdown—by roadsides.

2036. C. ECHINATA. Broadwater Forest. Eridge Park.

2037. C. REMOTA. Dallington Forest—uncommon.

2040. C. CANESCENS. Swampy field near Frant Station.

2046. C. GRACILIS. Witherenden Marshes. By the Rother, plentifully. No *C. riparia* was seen here.

2054. C. DIVERSICOLOR. Broadwater Forest. Eridge Park.

2062. C. PILULIFERA. Broadwater Forest. Eridge Park.

2064. C. CARYOPHYLLEA. Broadwater Forest. Eridge Park

2066. C. PALLESCENS. Dallington Forest—rare.

2067. C. PANICEA. Broadwater Forest. Eridge Park.

2074. C. SYLVATICA. Broadwater Forest. Eridge Park.

2075. C. HELODES. Broadwater Forest. Dallington Forest—plentiful.

2076. C. BINERVIS. Broadwater Forest. Ashdown Forest. Dallington Forest—south of main road.

2081. C. FLAVA. Broadwater Forest.

2085. C. HIRTA. Dallington Forest (apparently rare).

2086. C. PSEUDO-CYPERUS. Buckhurst Park—only seen by one pond.

2088. C. RIPARIA. Berwick Marshes.

2089. C. ROSTRATA. Witherenden Marshes—common.

2090. C. VESICARIA. Pond near Great Danegate. Benhall pond.

2101. SPARTINA TOWNSENDII. Cuckmere—both sides of river and estuary, becoming plentiful (V).

2107. ANTHOXANTHUM ODORATUM. Broadwater Forest. Eridge Park.

2110. ALOPECURUS MYOSUROIDES. Field near Mark Cross.

2114. A. PRATENSIS. Eridge Park.

2119. PHLEUM PRATENSE. Eridge Park. Broadwater Forest.

2126. AGROSTIS TENUIS. Near Frant.

2140. AIRA CARYOPHYLLEA. Sprat's Bottom (type).

2149. TRISETUM FLAVESCENS. Abundant by roadsides.

2157. SIEGLINGIA DECUMBENS. Broadwater Forest. Eridge Park. Piltdown, common.

2158. PHRAGMITES COMMUNIS. By the Cuckmere—common.

2160. CYNOSURUS CRISTATUS. Broadwater Forest. Eridge Park.

2165. MOLINIA CAERULEA. Broadwater Forest. Lewes.

2168. MELICA UNIFLORA. Broadwater Forest. Eridge.

2169. DACTYLIS GLOMERATA. Broadwater Forest. Eridge.

2172. BRIZA MINOR. Wadhurst. Frant.

2173. POA ANNUA. Broadwater Forest. Eridge.

2180. P. NEMORALIS. Buckhurst Park. Roadside near Fisher's Gate.

2183. P. PRATENSIS. Broadwater Forest. Eridge.

2190. GLYCERIA AQUATICA. Pevensey and Berwick.

2213. FESTUCA PRATENSIS. Near Wadhurst Station.

2214. F. ELATIOR. Meadows by the Cuckmere and Rother.

2216. BROMUS GIGANTEUS. Lewes (roadside). Buckhurst Park.

2217. B. RAMOSUS. Lewes (roadside).

2223. B. STERILIS. Broadwater Forest.

2226. B. COMMUTATUS. Broadwater Forest.

2228. B. HORDEACEUS. Broadwater Forest.

2232. BRACHYPODIUM SYLVATICUM. Broadwater Forest.

2240. AGROPYRON LEERSIANUM. Cuckmere near the Estuary.

2242. A. PUNGENS. Cuckmere and Seaford, abundant.

2246. NARDUS STRICTA. Eridge Park.

2248. HORDEUM NODOSUM. By Benhall Pond in field.

2249. H. MURINUM. Near Westdean and at Seaford, but apparently rare.

2250. H. MARINUM. Pevensey.

2257. HYMENOPHYLLUM TUNBRIDGENSE. By Eridge Rocks.

2263. BLECHNUM SPICANT. Broadwater Forest. Eridge Park. Buckhurst Park.

2273. ATHYRIUM FILIX-FOEMINA. Broadwater Forest. Eridge Park. b. ERECTUM. Buckhurst Park—only a few specimens seen, type absent. By stream below Cox's Mill Pond.
2277. PHYLLITIS SCOLOPENDRIUM. Buckhurst Park near Withyham entrance. By sluice of Cox's Mill Pond.
2287. LASTREA MONTANA. Eridge Park. Broadwater Forest. Buckhurst Park.
2288. L. FILIX-MAS. Eridge Park. Broadwater Forest.
2292. L. SPINULOSA. Eridge Park. Broadwater Forest. Sprat's Bottom, rare.
2293. L. ARISTATA. Eridge Park. Broadwater Forest. Buckhurst Park.
2307. EQUISETUM ARVENSE. Eridge Park. Broadwater Forest.
2310. E. PALUSTRE. Eridge Park. Broadwater Forest. Piltdown.
2311. E. LIMOSUM. Eridge Park. Broadwater Forest.
2327. PILULARIA GLOBULIFERA. Piltdown—in the pond.
2360. NITELLA FLEXILIS. Eridge—in pond opposite Inn.

The Botanical Section of the Tunbridge Wells Natural History Society was formed in the early part of 1932. Weekly rambles on alternate Saturdays and Wednesdays were arranged and have been much appreciated—the average attendance being 12-14 members. These excursions were all made in Sussex with a view to making some contribution to the new Flora of Sussex which is being prepared under the Editorship of our member, Lt.-Col. A. H. Wolley-Dod. The referees who were usually present included the President, Mr A. A. Pearson; Mr W. H. Pearsall, and Lt.-Col. A. H. Wolley-Dod. We were also greatly indebted to Mr E. D. Morgan for his knowledge of the local flora, and to Miss L. M. Child, the energetic Secretary of the section.

The only find of outstanding importance was that of the Butterwort —*Pinguicula vulgaris*—which was discovered on the 16th July in Ashdown Forest. This species, although well-known in sub-alpine boggy situations in the North, had not previously been officially recorded for Kent, Sussex, or Surrey. Its discovery was interesting from the fact that we were exploring a bog whose ecological conditions were identical with those favoured by this species and therefore could not understand its apparent absence. As a consequence, members were on the alert and ultimately Miss E. M. Harding discovered a good colony of plants which had flowered this year and were clearly well-established.

W. H. P.

CARDAMINE PRATENSIS L.

By G. F. Scott Elliot, M.A., B.Sc.

The Cuckoo-flower, often called Ladies' Smock or Meadow Bittercress, usually opens in April and so coincides more or less exactly with the arrival of the Cuckoo.

In Germany it goes by the name of " Schaum Kraut," probably because one often finds the frothy foam of the cuckoo-spit larva upon it.

There are many forms or sub-species which are often treated by botanists as independent species. Of these the most important is *C. palustris* Peterm.

It is, of course, necessary, according to the ordinary theory of evolution, that aberrant forms of the type should appear sometimes and somewhere.

But I have found in the same meadow extraordinary differences in the foliage and in the colour of the flowers. Moreover, the late Dr G. Claridge Druce appears to have regarded *palustris* as a variety of *pratensis* and O. E. Schultze, perhaps the best authority on the Cardamines, speaks of *palustris* as a plant of wet, saturated places and with *C. pratensis* " durch eine Gleitende Reiche vorbunden." That is, it is connected with *pratensis* by a fluctuating series of transitions (cf. Hegli).

It might be most interesting to work out these variations in connection with the amount of shade and the wetness of the particular habitat.

Hegli mentions that *C. palustris* is more common in the South and West than towards the North. When both are growing together, *C. palustris* flowers before *C. pratensis* and is brighter in colour. However, it is not intended to discuss here this interesting part of Cardamine's history.

When the cuckoo-flower opens in April, or thereabouts, one finds battalions of it in wet meadows and marshy places; by the banks of brooks and streams or even by roadsides.[1] Sometimes it may occur in wood clearings or in wet places amongst sand-dunes.

Hegli also states that it grows on " flach moors," that is on lowland peat mosses, and mentions Cotton grass as one of its associates.

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[1] Tansley gives damp neutral grasslands, including meadow lands; juncetum communis, *Quercus sessilis*, on siliceous soils: alder-willow association. (Types British Vegetation).

In the sub-arctic and northern region, it may be found all round the North Pole, even in Grinnell Land (81° 42′ North Lat.). It is a hardy adaptable plant with a very wide distribution.

The flowers are at first pink, but later on become either pure white or a pale violet with darker veins. There is generally one flowering stalk (a raceme) with the older flowers at the base, but sometimes there may be one or two supplementary branches each with two, three or more blossoms.

The upper surfaces of the petals are covered with minute wrinkled hillocks producing a sheen or play of light just as is the case with the Sloe.

There is a certain elegance in the inflorescence which is perhaps due to the varying curves or angles of the separate flowerstalks; the older the flower, the more curved is the stalk. The petals when mature tend to form a horizontal platform. If one looks down upon a good normal flower from above, the lurid green nectaries can be distinctly seen; there are four of them; two are placed more or less all round the short stamens and two below the junction of each pair of long stamens.

The insect usually stands on a petal and pushes its proboscis down the little channel leading to the honey which runs into a pocket in the bulgy base of the sepal.

Three stamens are arranged round this canal; the short one sheds its pollen inwards; the two neighbouring ones during growth make a quarter left and right turn respectively; their anthers open upwards so that the top is pollen-covered. The stigma, that is the receptive part of the style, is on the inner side of the canal.

It follows that the insect will touch the stigma with one side of its head or body, whilst the other side will be well dusted with pollen.[2]

The stalks or filaments of the stamens are distinctly elastic; if bent back with a pin, they spring forward and a little cloud of pollen is thrown off.

In fine weather, with plenty of insects about, cross pollination is thus almost certain.

At night, or in dull wet weather, the flower shrinks together, returning nearly to the position of a younger flower before it is quite ripe. When fully open it may be 20 mm. across, whilst it is only 10 mm. at night; so also in wet weather, they do not open to their full extent, and the petals, instead of forming a platform, remain almost in line with the sepals.

This brings about two distinct and separate results. Rain will not reach the stamens; the wind as well as the weight of the flower will keep the open part towards the lee side so that no water will enter, and thus the pollen will not be injured. Secondly, in cold, wet inclement weather the long stamens do not make their quarter right or left turns. Yet they elongate as usual until they are well above the stigma. When the latter is fully developed, it often touches the anthers, and pollen is left on the sticky stigma.

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[2] Pirotta (5).

According to Hildebrand and Correns, this possibility of self-pollination is of no use, for the flowers are, in their view, self-sterile. Hildebrand states that the pollen grains easily germinate in 15 to 30% cane-sugar with 4% gelatine, but if pieces of the stigma are put in the solution, they do not develop pollen-tubes. Correns' experiments hardly seem conclusive (6).

There are considerable differences in the sizes of the flowers in different places. In Galloway they are usually from 20 to 24 mm. in diameter; even in Arctic Siberia, they may be 24 mm., but in the Faroes they are only 21 mm., in Arctic Norway 13-18 mm., and in Nova Zembla 10-15 mm. In the last two places they are slightly fragrant.

In most ordinary localities, the stigma seems ready for pollen before the flower's own anthers have opened, but in the Faroes and Arctic Norway both mature simultaneously.

In the far north, ripe fruits have been noticed at Cape Thordsen (Spitzbergen) and in Alaska, though seldom in Greenland. In this last place, bulbils are formed on the leaves and these propagate the plant. In Arctic Norway, 95 to 100 per cent. of the pollen grains are useless, and no seed has been observed.

It is clear that the Cuckooflower is by no means rigidly fixed as regards size and methods of pollination and especially when it is exposed to extremely rigorous conditions of life. (See below.)

One would even have guessed this to be the case from the very mixed crowd of visitant insects which carry its pollen, for the Cuckooflower is used by all sorts of insects (7).

At first sight the flower hardly seems rigid and strong enough to bear the weight of a Bombus. But if one dissects it carefully, one sees that the stout rigid base of the petal fits exactly in between the sepals: the edges of two neighbouring petals overlap slightly and are supported by the tip of a sepal. Hence even a comparatively heavy insect will have its weight distributed over three petals and two sepals.

The visitors which may be observed vary according to the hour, day, month, weather or peculiarities of the locality. But Cardamine is on the whole wonderfully fortunate in its clients.

VISITORS OF CUCKOO-FLOWER.

	Muller.	Knuth, Germany.	Alfken, Bremen.	Rossler, Wiesbaden.	De Vries, Holland.	Macleod, Flanders.	Fritsch, Styria.	Poppius, Finland.	Pirotta, Italy.	Willis & Burkill, Britain.	Scott Elliot, Dumfriesshire.
Honey Bee, Apis	×	×	—	—	—	×	—	×	—	—	—
Bombus (Bumble Bee)	×	×	2	—	—	×	—	×	—	—	—
Smaller Bees and Wasps	×	—	×	—	×	×	—	—	—	—	×
Andrena	4	—	—	—	—	3	—	—	—	—	—
Halictus	×	—	—	—	×	2	—	—	—	—	—
Nomada	2	—	×	—	—	—	—	—	—	—	—
Osmia	×	—	—	—	—	—	—	—	—	—	—
Butterflies	×	—	×	×	—	×	×	—	×	×	×
Pieris Napi	×	—	—	—	—	×	×	—	×	×	×
,, Brassicae	×	—	—	—	—	×	—	—	—	—	—
Vanessa Urticae	×	—	—	—	—	×	—	—	×	—	—
Diptera	×	×	—	—	—	×	—	—	—	×	×
Large Hoverflies	×	×	—	—	—	×	—	—	—	×	×
Bombylius	2	—	—	—	—	×	—	—	—	—	—
Eristalis	—	—	—	—	—	5	—	—	—	—	—
Empis	×	—	—	—	—	×	—	—	—	×	—
Melanostoma	×	—	—	—	—	×	—	—	—	×	—
Rhingia	×	—	—	—	—	—	—	—	—	—	—
Syrphus	×	—	—	—	—	—	—	—	—	—	×
Helophilus	×	×	—	—	—	—	—	—	—	—	×
Small Flies	×	×	—	—	—	×	—	—	—	×	×
Anthomyia	×	×	—	—	—	×	—	—	—	×	×
Beetle—Meligethes	—	×	—	—	—	—	—	×	—	×	—

Figures refer to number of species.

The ground plan of the flower of the Crucifers is peculiar and there are many ingenious explanations of the way in which it may have originated.

There are two main theories: some hold that it was originally in parts of four, whilst others believe that, like the Fumitory to which it is certainly allied, sepals, petals, etc., were in circles of two (8).

There is some evidence to show that each pair of long stamens is really a divided or branched single one, for there is at first but the one rudiment.

The immature flowering stem is at first completely enclosed in the young stem leaves which are curved inwards over one another and over the minute closely-packed embryo flowers. Bracts, not being required, are not usually present.[3]

In the unopened flower, the two outer sepals overlap one another at the tip where they are closely united or held together by their white margins and remain firmly connected even after the flower is in active growth, the two other sepals are therefore covered and are joined together; the bulge at the base of the outer one is a natural consequence of this state of bondage; there is also room below for the nectaries.

Let us examine a little more closely what may have happened in consequence of the union of these two outer sepals. We will suppose that the ancestor flower had one pair of petals, two pair of stamens and two of carpels. This must have brought about a tightness, a state of bondage or compression in the plane passing through the stem.

Hence the original single petal rudiment was squeezed sideways and became two separate petals: the stamen rudiment was also forced to form two halves which are the long stamens: the existence of the two carpel rudiments is doubtful but the strong frame or edge of the fruit may represent all that is left of them.

So there is at least a chance that this very trivial character, the sticking together of the two outer sepals at the tips may have influenced or originated the peculiar arrangement of the Cruciferae which is one of the most successful natural orders.

It is also on account of this state of bondage that the short stamens remain curved. The anthers of the long stamens are packed in above those of the short ones, but, below the stigma, these together form a little cone, round which are rolled the thin tissuepaper-like petals.

These latter, whilst still imprisoned, grow just as far as and in such a direction as they can. At the top, they are not only rolled round but bent both over the stigma and over one another. Even after they are set free by the separation of the sepal tips, they still form for a time a small purple cone projecting out of the sepals. All this naturally follows from the conditions in bud. But as a result of these conditions insects will find it difficult to effect an entrance at this stage of unfolding (between bud and full flower) which is a very dangerous time. In the "cone stage" the four longer stamens can and do grow, but the short ones being curved and held at the tip cannot do so.[4]

After pollination the stalk of the flower elongates: it is at first curved upwards: when the petals and sepals fall off, the young fruit is in a line with its stalk.

But as it ripens, the fruit begins to point more and more directly and vertically upwards; the stalk (pedicel) also inclines upwards and nearer the main stem until it is nearly at an angle of some 30° with it.

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[3] Now and then, however, the uppermost stem leaf is reduced to a single terminal leaflet and can hardly be called anything but a bract.

[4] The reader will find further details in a treatise by Dr Genthardt (12).

When fully grown the fruit[5] gradually dries and hardens: this, of course, is quite the natural result of the physical process of drying. But when one looks at its shape it is clear that the carpels had to split away from the outside edge and from below.[6] There is a sudden and quick separation and the seeds may be hurled to a distance of five or six feet.

After being thrown away, the seeds will probably fall on mud or wet ground. They may fall in water, but according to Dr Guppy, they are unable to float and sink almost at once.[7]

As in Caltha, the outside skin of the seed becomes mucilaginous or sticky when wet and will adhere to birds' feathers or legs. It may, therefore, be carried quite a long distance by wading or marsh-loving birds such as curlews, snipe, whimbrel, etc.

The leaves of Cuckoo flowers are exceedingly variable. The first formed radical ones are often very small with the terminal leaflet and only one or two others. Almost all leaves in the great majority of plants begin by being folded or bent inwards; then the stalk or petiole develops, and when nearly mature the leaf unfolds and turns right over so that what was the inner surface faces upwards and receives sunlight. In the first formed radical leaves of *Cardamine pratensis*, the outward and downward turn is very marked; in a very young plant which was removed from the soil and placed on a table the leaf stalks were able to support the plant at a height of 2½ cm. above the table.

The ordinary radical leaves have up to 7 or 8 pairs of leaflets as well as a terminal one, and certain of their minute characters appear at first sight to be of no possible use. Thus the leaflets are not exactly opposite, and each pair is not attached to the stalk in quite the same plane. Each has a single minute point at the tip, whilst the one at the end has three or four points.

In the very young bud, the older leaflet projects above the younger one; in this stage, the end leaflet is folded and the other leaflets fit in, one behind the other, on the under inside surface of the curved stalk.

Now imagine a minute insect crawling up the leaf stalk—it is faced by a row of stiff hairs or knobs, that is by the points of each leaflet; there are also coarse hairs all along the stalk and on the leaflets; to the marauding insect, this will be an unpromising proposition. Instead of being useless, these minute characters are, therefore, of great advantage.

The later stem-leaves are on the whole similar, but the leaflets are narrow, and almost the shape of a canoe.

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[5] The strong framework or "replum" is an argument for there having been four carpels. Ovules are usually attached at the united edges of two carpels. How then can one explain the framework between the edges? Tetrapoma and some Drabas have four valved fruits. Two extra carpels have been noticed in abnormal flowers of Cardamine (12).

[6] M. Joxe, *l.c.*, states that four lines of separation " proviendraient d'une sorte d'écrasement des tissues de pericarpe comme au fond, d'un pli entre les bords des valves et le cadre formé par les faisceaux marginaux " (11).

[7] Detached leaflets of *Cardamine hirsuta* are abundant in the drift of the Thames and Lea (Guppy): they root and germinate in the spring (13).

All leaf-stalks are grooved on the upper surface, and rain will be carried off down the stem and thence to the underground stem.

In microscopic structure, the leaf is of the ordinary type; there are, according to the amount of exposure to light, two or three layers of oblong green "palisade" cells.

The stem is also interesting; the cell walls of the epidermis are thickened both outside and inside. There is a ring of strong hard supporting tissue with bundles attached to it, some on the outer side and some within. Between the epidermis and the mechanical ring are four to six rows of green cells with many air spaces between them; just touching the ring is a circle of clear cells often with starch grains enclosed.

With regard to its stem and foliage, *Cardamine pratensis* has had to solve certain special problems.

The stem must be formed as quickly as possible, for it has to be ready and flowering must be finished before the vigorous growth of meadow hay, Ragged Robin, etc., will make pollination and the scattering of seeds a very difficult matter. It grows in moist or wet places, yet in spring there may be dry periods and perhaps stormy weather.

Quick development is favoured by the rich store of starch in the underground (or under-mud) rhizome, which is about a quarter of an inch in diameter and is packed full of reserve food. The green cells of the stem will be useful in forming carbohydrates rapidly. There are numerous roots; these, and the peculiar stomata, are well adapted to the quick supply and transpiration of water.[8] From an engineering point of view, the hollow cylinder, with its outer tough skin, is clearly excellent. The leaflets also are well suited to the needs of the situation: they can unfold and get their place in the sun quickly.

As in most plants of moist situations, a full supply of oxygen is required, and the tissues of *Cardamine pratensis*, as is usual in aquatics, contain many air spaces.

All these necessities of its favourite situations—rapid growth, toughness and strength, oxygen supply and quick, abundant transpiration—are provided for by the simple yet effective design of leaflets, leaf-stalk, and stem.

Cardamine pratensis is certainly a variable species. In one meadow, I found the number of flowers per plant varying from three to forty-three. The reader has only to search any locality where the plants grow in quantity and he will find quite extraordinary differences in stem, leaf, size of flowers, etc., etc.

An interesting case is that of a plant which grows in the Chilean Andes. Hooker, following Gay, considered it to be a form of *C. pratensis*, but Dr Reiche places it under *C. hirsuta*[9] (3). This shows that there is so much variation in Cardamine that even these three distinguished botanists were not in agreement.

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[8] The pores or hydathodes are most interesting, but would require more space for description than is here possible.

[9] The last-named author also describes three other varieties from South Chile and Terra del Fuego.

There is yet another interesting question in the story of this common weed. Is it of the least use?

Wet, marshy ground is always liable to degenerate into a peat moss. The good pasture grasses are apt to be drowned out by useless marsh plants or choked by Sphagnum. Spring is one of the most dangerous periods in the northern hemisphere, for the rainfall in February is often extremely heavy.

The multitudes of rapid-growing stems of Cuckooflower, all supplied by elaborate root systems, tend to keep the meadow sufficiently dry for a rich growth of Ragged Robin (*Lychnis Flos-cuculi*), of *Carum verticillatum*, etc., etc. These are followed by tall grasses.

The spot where thousands of Cardamine bloomed in spring will be later on covered by thick hay, 18 inches to 2 feet in height.

The custom of mowing such meadows for hay goes back at least as far as the Viking period. It is almost impossible in Britain to find out what would happen if the hay was not cut for 30 or 40 years. It is probable that in time coarser grasses, tall herbs and eventually Willows, Birch, and Alder would overgrow the meadow. Eventually an Oak forest would be the final term or " climax of vegetation," being the best type possible in our latitude and climate.

But whether this be so or not, the Cuckooflower not only manages to get in its own life history, but is also a very important member of the Wet Meadow Society. It helps to drain or rather makes good use of quite large quantities of water which might otherwise drown out all its assistants and successors.

In Spain it is confined to the Northern and Central provinces and in France grows everywhere except in the Midi. In Scotland it is recorded to 2800 feet (Perthshire, Buchanan White), and in the Bernese Oberland to 2160 metres altitude.

So far as I can gather from records, one might collect *Cardamine pratensis* near Constantinople, on the Caucasus, in China, or even in Japan.

In N. America it may be found as far south as the Williamet valley near Portland (Oregon) and New Jersey.

An even more remarkable fact is that Schimper (2) discovered it by mountain streams in Abyssinia. There are also species in Chile which appear to be closely allied.

The Cuckooflower is very often damaged by insects as well as by Fungi. I have found that in some places 95 per cent. of the flowers have been so injured and in most places, 25 to 30 per cent. are bitten, holed or entirely devoured.

The flowering stalks are often deformed by the Cuckoo-spit Insect which is a reddish, squat, toad-like creature with dark brown eyes.

Yet these attacks do not prevent flowering. One specimen which had all its leaves more or less seriously bitten or injured had 18 flowers on the main stalk and 3 or 4 flowers respectively on two supplementary ones.

Upon the leaves, one Rust,[10] two Mildews,[11] and at least three other parasites[12] have been recorded as well as other fungi which attack dead and decaying stems and leaves.

There are some 60 species of Cardamine: most are scattered over the northern temperate zone, but there are also a few in Australia, temperate South America, etc.

There are many interesting questions connected with the distribution both of the genus Cardamine and of *C. pratensis*. As we have seen *C. pratensis* has an enormous range. So also has *C. impatiens*, which ranges from the Pyrenees to Japan.

But the greatest traveller of all is *C. hirsuta* which is common in all the North Temperate Regions as well as in Hawaii, Mexico and Chile.

But Cardamine does not occur in the index of the invaluable "Origins of the British Flora" by Dr and Mrs Reid.

But if one follows the course of any British river one may find the Cuckooflower flourishing all the way along the valley flats, up the tributaries and even along the small burns into the recesses of the hills wherever there are little marshy flats. But so far as my own experience goes, it does *not* grow in peaty moors and mosses.

You do find it where the capping of peat has been worn away but not actually in peat. Therefore its seeds could not be expected in peat mosses.

The chief interest lies in the enormous range of the genus Cardamine.

In order to realise this, let us suppose ourselves to set out in an aeroplane in order to study the distribution of Cardamine. Starting from Ireland, one finds in Europe besides the ordinary species, another species along the Pyrenees. In the great massif of the Alps, there are four others. Then turning south three species grow in the Apennines and still further south there is an endemic species in Corsica.

Still keeping to the south one finds four other species in Abyssinia, Ruwenzori, and other African mountains.

Returning to the Alpine chains, and turning eastward, there is a Cardamine in the Carpathians, six more on the Caucasus, seven others on the Himalayas.

Then one would pass on eastward to China, where there are eight species (or probably several more), to Japan where again are six others. About Behring's Strait there are four species as well as six in Siberia.

Crossing the Continent to Labrador one discovers on the Atlantic coast of North America eight species. *C. pratensis* is found in Northern New Jersey.

But recrossing to the Pacific Slope, Cardamines occur in numbers; there are several in the Rocky Mountains, three on the Pacific Slope, including *C. pratensis* (at Portland, Oregon).

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[10] *Puccinia Cruciferarum.*

[11] *Cystopus candidus, Peronospora parasitica.*

[12] *Ramularia cardaminis, Synchytrium aureum, Septoria cardaminis.*

Still pushing southwards there are many peculiar species along the Andes, and no less than twenty-nine species have been described from Chile.

Having reached Cape Horn, we turn West and find a species in New Zealand, two in Australia, and at least four in the various Antarctic Islands.

Touching at the Azores on the way home, there is an endemic species there also.

If one had a definite date for the first appearance of Cardamine in the world, then it would not be so very difficult to understand its distribution. Obviously it must have come into existence somewhere and somewhen.

It is, of course, agreed that there was during most of the tertiary period a warm temperate forest which appears to have been continuous from Norfolk to China and across America to Labrador.

But in the latter part of the pliocene, communications were broken. For between the Caucasus and the Himalayas, all forests dried up and were replaced by steppes, semi-deserts, or even salt deserts.

Dr Reid and others have shown that during the pliocene period, the flora of Southern France lost a large proportion of its more tender constituents, but of these last a number reappear in upland mountain valleys in the Himalayas and in China.

This seems to me to make it probable that the ancestor of Cardamine existed in early pliocene times.

Then as the whole series of Alpinid mountains[13] developed, the various alpine or montane species of Cardamine differentiated, each in its different little group of valleys.

Each species was isolated from its ancestor and from its cousins.

So also along the quite modern though gigantic mountain ranges, the Canadian Rockies and Andes, the ancestor took advantage of the innumerable variations in altitude, habitat and other conditions to establish little independent colonies all the way from Alaska to Southern Chile, and these became the modern Cardamines there.

A connection between Chile and New Zealand and Australia seems to me to require a landbridge. There are many considerations which point to this solution.

During the pliocene, there surely was a land connection with Africa by Sicily and Tunis. Thus Corsica, which was isolated in early pleistocene times, had its Cardamine freed from outside competition. There was also some route from the Eastern Atlas to Abyssinia, as Engler has pointed out.

The most difficult problem of all is to explain the species which lives by itself on the Azores.

This would involve either a miocene Cardamine, which seems unlikely, or distribution by birds from Chile.

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[13] Includes Carpathians, Caucasus, Himalayas, etc.

Schultz suggested a centre of origin in the Pacific continent now submerged.

I do not believe in the age and area theory according to which the distribution of a plant depends upon its age.

If that were so, and if it were applied to the races of mankind, the Scotch would be the oldest race in Europe, whereas they are a very young people, not 700 years of age.

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BOTANICAL EXCURSIONS IN HANTS.

Two years ago I left the Lake District and permanently settled in Kent. Shortly before my removal I had been interested in a newspaper correspondence contrasting the relative virtues of the northcountryman with those of the southerner, and I was therefore interested in ascertaining what the facts really were. I am bound to admit that although still a comparative stranger, I have been greatly impressed by the overwhelming kindness and courtesy shown to me on every hand, and especially by southern botanists I have been privileged to meet. I have enjoyed some delectable days exploring the "forests," downs, and seashores of East Sussex in company with Mr A. A. Pearson, Lt.-Col. A. H. Wolley-Dod, and other members of the Tunbridge Wells Nat. Hist. Soc. At the end of August Mr W. D. Miller and myself were the guests of Mr and Mrs P. M. Hall at Fareham, Hants, and had a right royal time. I was feeling pretty limp after being snowed under for six months with correspondence and "copy" in connection with the 1931 *B.E.C. Report*, and therefore the change to fresh air, open spaces of glorious country, and most congenial company was to me a great joy and is still a fragrant memory.

The first day was spent exploring the New Forest. We motored to Lymington and thence to Wilverley Enclosure, where we were shown in a moist sandy habitat the rare *Illecebrum verticillatum* L. This is found only in five of the southern counties and was quite new to me. Here also we saw *Radiola linoides* Roth and *Scutellaria minor* Huds. Shortly afterward, we were joined by Dr Eric Drabble and Mr J. W. Long, who had arrived by boat from the Isle of Wight, and drove off all agog to the wet heaths and spongy bogs at Holmsley. Here we met our new member, Mr W. J. L. Palmer, and spent a delightful time under ideal meteorological and social conditions. I was especially interested in comparing the associated plants with those found under similar ecological conditions in the north, and hastily dotted down a list of the plants one would expect to find in such a habitat. I did not include *Pinguicula vulgaris*, as neither the altitude nor the slope of the ground seemed sufficient for that species, but on the whole the plants found were identical with those growing in similar northern habitats. The noteworthy additions were *Cicendia filiformis* Delarb.—which was new to me and afforded the usual "thrill"—and *Ulex minor* Roth, not seen in the N.W. I was impressed with the unusual size of *Rhynchospora alba* (15 in.-20 in.), which was twice that of the average northern form. The following plants were noted:—*Lycopodium inundatum* L., *Rynchospora alba* Vahl, *R. fusca* Ait., *Drosera rotundifolia* L., *D. anglica* Huds., *D. longifolia* L., *Schoenus nigricans* L., *Juncus acutiflorus* Hoffm., *Ulex minor* Roth, *Myrica Gale* L., *Pilularia globulifera* L., *Sagina nodosa* Fenzl, *Hypericum elodes* L., *Cicendia filiformis* Delarb. (*Microcala* of the *L.C.*), *Scirpus fluitans* L., *Agrostis canina* L.

After lunch we went on to Lyndhurst and were shown the very rare grass *Leersia oryzoides* Sw., which is found sparingly in four southern vice-counties. In this vicinity also was the even rarer and decreasing *Spiranthes aestivalis* Rich., and *Ludwigia palustris* Ell., both of which are now confined to Hampshire and Jersey. Other plants noted were *Bidens cernua* L., a viviparous form of *Juncus bulbosus* L., *Radiola linoides* Roth, *Euphrasia nemorosa* Löhr, *E. anglica* Pugs., and *Illecebrum verticillatum* L. in a second station.

Near Beaulieu Road we found *Utricularia minor* L. in flower and the rare *U. intermedia* Hayne, which seldom flowers and has most of its bladders on separate leafless shoots.

At Hatchett's Pond we saw *Spiranthes spiralis* Koch, *Erythraea pulchella* Fr. and *Centunculus minimus* L. In a former gravel pit near Lymington we found a fair quantity of the rare *Gastridium ventricosum* S. & J. (*G. lendigerum* Gand.). This species somewhat simulates an Agrostis but has a remarkable shining enlargement at the base of its outer glumes. Here also were *Vicia tetrasperma* Moench, and *V. hirsuta* Gray in plenty, with *Briza minor* L. mostly in fruit but one or two still recognisable, and also specimens of the Continental *Silene gallica* L.

We next visited Sowley Pond but found it difficult to get to the actual water. However, we managed to procure specimens of *Chara hispida* L. and *Myriophyllum alterniflorum* DC. The margins showed *Lysimachia vulgaris* L. and *Typha angustifolia* L. in quantity. Coming back we caught a glimpse of *Linaria repens* L. in a hedge near Marchwood, passed through Totton, and so to Fareham. A strenuous and memorable day ended in peace and quietude with Miller knitting socks, the scribe smoking, and the most hard-worked member of the community asleep on the couch!

It had been decided that the second day should be devoted to an investigation of the aquatic plants in the Basingstoke Canal. We accordingly motored to Odiham for this purpose. Several species of Potamogeton produce fruit only at long intervals—often 20-30 years—under exceptionally favourable conditions of abundant and continuous light of high actinic power at the period of anthesis. One of such species had already shown abundant fruit during the same month in the English Lakes, so we were not surprised to fine another—*Pot. alpinus* var. *Palmeri* Druce—in magnificent fruiting condition in the canal for a considerable distance, after an exceptionally fine August. The highly calcareous nature of the habitat accounts for the exceptional breadth of the leaves of this variety and also for the large, finely-developed and well-rounded leaves of the form of *Pot. natans* L., which occurs here. *Pot. densus* L.—another " indicator " species—was in great abundance and more than holding its own against the competition of *Elodea canadensis* Michx. Other interesting species observed in the water or along the banks of the canal were *Hippuris vulgaris* L., *Potamogeton Friesii* Rupr., *P. alpinus* Balb. (type), probably on patches of less calcareous mud, *Ranunculus sphaerospermus* B. & B., *Sagittaria sagittifolia* L., *Rumex Hydrolapathum* Hnds., *Sparganium ramosum* Curt., *S. simplex* Hnds., *Lamium album* L., *Menyanthes trifoliata* L., *Callitriche intermedia* Hoffm. and *C. obtusangula* Le Gall.

We subsequently motored to Fleet Pond and by the side of the road leading to it saw *Epipactis latifolia* Sw. and a fine growth of the adventive *Juncus tenuis* Willd. We found the water in the shallow pond too low for our purpose, unfortunately. Earlier in the year Mr Hall had sent me specimens of *Potamogeton panormitanus* Biv. Bern. and *P. trichoides* Cham. et Schl. from this pond, and we were anxious to see them *in situ*. By wading, Mr Hall obtained a few specimens of the former and fragments of the latter. We were too late for good fruiting examples of these species, which are characterised by the extreme rapidity with which their lower stems blacken and decay immediately after fruiting—especially in a falling water, under brilliant sunshine It only needed the activities of the bathers and boys we saw paddling about to account for the practical disappearance of the pondweeds. On the muddy margins of the pond there was abundance of *Scirpus acicularis* L., and several patches of *Elatine hexandra* DC. This wide and shallow sheet of water would repay systematic surveying from a boat, and we envied the aimless youth who had procured one. Leaving Fleet we wriggled out of its immediate vicinity after an amazing exhibition of caterpillar-crawling by the car, into and out of deep ditches, and upon regaining the road made off West over the North Downs to Micheldever. Here we spent a short time exploring the sparsely grassy slopes of some dry chalky hillocks, where the following characteristic species were noted—*Campanula glomerata* L., *Gentiana Amarella* L., *Teucrium Botrys* L., *Pastinaca sativa* L., *Cnicus acaulis* L., *Antirrhinum Orontium* L. and *Euphrasia nemorosa* Löhr. As an ecological study these chalk mounds were of great interest, but the shadows were lengthening and so we sped on to Worthy Down, north of Winchester, where we saw *Eryngium campestre* L. in quantity, very well established but not thought to be indigenous. Here also we found *Habenaria viridis* R. Br. On a down near Owslebury we saw the leaves of *Antennaria dioica* Gaertn.—one small patch, the only known habitat in S. Hants. A little further on we were shown a form of *Epipactis leptochila* Godfr. growing under abnormal conditions of shade and the relative absence of other ground vegetation which were very unusual. By this time the light was rapidly failing so we reluctantly left this interesting habitat, started on our final run to Fareham, and so brought our second day's excursion to a close.

We devoted the morning of our last day to exploring the unusually luxuriant associations of maritime plants on Hayling Island. Many of them—Statice, Spartina, Salicornia, Chenopodiaceae—would have repaid prolonged investigation, but for this we had insufficient time. We were anxious to see the rare *Polypogon monspeliensis* Desf. and the much rarer *P. littoralis* Sm. (*P. monspeliensis* × *Agrostis alba*) at Farlington. The former was seen in plenty and obviously indigenous, and we were fortunate to find good examples of the distinct and interesting hybrid. This discovery was a final and fitting enjoyment to a very memorable holiday.

W. H. P.

A NOTE ON THE SOUTHERN DISTRIBUTION OF LISTERA CORDATA.

My thanks are due to Messrs G. T. Harris, P. M. Hall, and numerous other correspondents for help in preparing this paper. There are probably errors, but I hope they are few.

TOPOGRAPHY.

Bentham (*Br. Fl.*, 458) gives the general distribution of *Listera cordata* as follows. " On mountain heaths in Northern and Arctic Europe. Asia and America, extending southward to the Alps and the Caucasus. In Britain confined to Scotland, the north of England and some parts of Ireland." Watson (*Top. Bot.*, 2nd edition, pub. 1883, p. 383) gives the distribution in Great Britain as North Devon (4), South Somerset (5), Dorset (9), and South Hants (11): then Shropshire and North Wales and increasing towards the north.

HABITAT.

" Turfy mountain moors," Babington. " On mountain heaths," Bentham. " Turfy moors," Hayward. In my experience always associated with Ericaceae, *Erica cinerea*, *Calluna* and *Vaccinium* spp., etc. Most luxuriant growth in more or less open pine woods. I have seen the plant within a few feet of sea-level on Little Loch Broom in West Ross.

HABIT.

Listera cordata Br., too well known to need a detailed description, is perennial. Some six inches beneath the soil it sends out among the matted heather roots a number of white rootlets rather strong in comparison with its delicate structure above ground. Many plants—presumably the younger ones, as in the case of *Paris*, etc.—exhibit the pair of heart-shaped pointed leaves without producing a flowering stem. Seed is set freely, and it may be that the seeds are able to lie dormant for many years before particularly favourable climatic conditions induce germination. This, if proved, would partly account for its apparent disappearance from and reappearance in known localities.

EVIDENCES.

At one time or another Lesser Twayblade has been recorded from stations in Devon, Somerset, Dorset and Hants: and I propose shortly to examine the evidences for these records. It has not been reported from Cornwall or from any other county of England or Wales south of Shropshire and Denbigh.

DEVONSHIRE.

Devon records are from Morthoe; Codden Hill, near Barnstaple, and from three stations near Sidmouth.

Morthoe. W. P. Hiern, F.R.S., in his *Census of Devon Plants*, quotes this station on the authority of Keys (*Flora of Devon and Cornwall*, pub. 1866). (Isaiah W. N. Keys was Curator of Botany in the Plymouth Institution in the middle of last century). However, Keys only quoted the *North Devon Handbook*, a general guide to North Devon. The Rev. T. F. Ravenshaw, in bringing up to date in 1877 the plant list of the *North Devon Handbook*, retained the Morthoe record without comment. On the ground that there is very little—if any—suitable habitat for the plant in Morthoe Parish, the rocky promontory only reaching an altitude of 450 feet and being almost destitute of heather, and there being no extant specimen or record of the original finder, I come to the conclusion that not only is the plant no longer there, but that the original record was probably an error. In this I follow several Devon botanists.

Codden Hill. This is a steep heather-covered hill, 630 feet in height, three miles S.S.E. of Barnstaple. In the Hiern herbarium at the R.A.M. Museum at Exeter there are two sheets of the *Listera* from this locality, labelled N. B. Ward and the Rev. W. S. Hore, and dated the same day, June 6th, 1843. There is thus no doubt that 90 years ago the plant was to be found on Codden Hill. Unfortunately, and in spite of the most careful search in recent times by Mr Taylor and others, it has completely disappeared. This disappearance is considered to be the result of systematic heather burning, or swaling, on the hill.

Sidmouth. Keys (*op. cit.*), apparently quoting the Rev. R. Cresswell's *The Flowering Plants and Ferns of Sidmouth and Its Vicinity*, pub. 1846, and Cullen's *Flora Sidostiensis*, pub. 1849 (which two lists are in many respects identical), gives three stations for *Listera cordata* in the neighbourhood, viz.:—Trow, Dunscombe, and Sidbury Hill. Miss Cresswell writes me: "*Listera cordata* does not occur in my Father's list of the flowering plants of Sidmouth. He includes under Orchidaceae, No. 479, *Listera ovata*, Common Twayblade, Castle Hill, Sidbury." Cullen's note reads: "*Listera cordata*, Common Twayblade, Trow, Dunscombe, Sidbury." He does not mention *Listera ovata*. There can be little doubt that Cullen allowed to pass an error in the trivial name, and that the stations given must be disallowed, and erased from the lists of Keys and (later) Hiern, especially as there does not seem to be any herbarium specimen from the locality nor any note of the plant there for the last 85 years. It should, however, be noted that there is in the neighbourhood a considerable area of suitable ground rising to over 500 feet, and covered with heather, conditions similar to those of the undoubted record near Charmouth, thirteen miles further east. It is highly unsatisfactory that our conclusions should rest to some extent on a possible slip of the pen, copied and recopied as it has been into later works. Unfortunately any enquiry into plant history suggests many such uncertainties. Thus at the present day the Lesser Twayblade is not known to be a Devonshire plant.

SOMERSETSHIRE.

In Somerset the status of the plant is clear and well vouched.

Dunkery Beacon. As stated by Murray (*Fl. Somerset*, 313), the Rev. W. H. Coleman records the plant from " Near the summit of Dunkery. . . . There is a specimen from this locality in Herb. Watson " (at Kew). Coleman marked a copy of the *London Cat.*, 2nd edition, " for plants seen within five and ten miles of Minehead and Dunster in the spring and early summer of 1849." (Murray, *op. cit.*, introduction). In the general herbarium at Taunton Castle belonging to the Som. Arch. and Nat. Hist. Society, there are two specimens labelled " Exmoor, Somerset, Collector C.P." In a MS. list of rare Somersetshire plants, dated 1850, the Rev. C. Parish mentions *Listera cordata* as gathered by himself in " swampy places " on Exmoor " from 1500 to 1800 feet." As very little of Exmoor is over 1500 feet, and Dunkery Beacon the only ground over 1600 feet, it is probable that Parish's station was identical with Coleman's. Another specimen in the same herbarium is labelled " From high ground on the border of Exmoor. July 4, 1858. Collector, T. F. Dymock." Up to 75 years ago then there is no question that the high ground about Dunkery Beacon carried the plant. There followed a complete blank till June 1931, when—during an excursion of the S.W. Naturalists' Union to Dunkery—two small plants in bloom were discovered.

Chipstable. A record from " Brendon Hill, near Chipstable, 1872; Z. J. Edwards," given in *Fl. Som.*, is unvouched, and the plant has not since been noticed there. There is, however, no reason to doubt it, as the Brendon Hills run up to 1300 feet, and there are wide stretches of suitable heather country.

Winsford Hill. Some five years ago *Listera* was somewhat vaguely reported on a shoulder of Winsford Hill about six miles due south of Dunkery, and a frequent and diligent search was rewarded in 1931 by the discovery of at least a dozen plants. This year (1932) I visited the spot after flowering time, and estimated that some 50 plants were present in an area of about ten yards by five yards. Only a few had flowered. The tiny plants were buried in moss and heather two feet high on the edge of a long disused gravel pit at an elevation of 1170 feet. There must be many square miles of similar ground on Exmoor, and it is highly probable that undiscovered patches of the plant exist. In any case *Listera cordata* is definitely a plant of Exmoor at the present day.

DORSETSHIRE.

Watson (*Top. Bot.*, 2nd ed., pub. 1883) cites " Mr Borrer " for the occurrence of the plant in Dorset. The facts appear to be that the Rev. H. Roberts gathered *Listera cordata* in 1853 on table land between Bournemouth and Boscombe Chine. (E. F. Linton, *Fl. Bournemouth*, 2nd ed., 1919. Appendix, p. 299). This is in Hampshire. As Mr Roberts writes (*in litt.*, fide H. C. Watson), " specimens were sent by a friend to Mr Borrer, who pronounced them correctly named." Borrer's herbarium at Kew contains a specimen labelled " Bournemouth. Rev. John Austen. May 14, 1856." Watson seems to have assumed that one at least of these Bournemouth stations was in Dorsetshire. Not so

Mansel-Pleydell (*Fl. Dorset*, pub. 1895), who claims the discovery of the *Listera* in the Charmouth district by Ridley and Fawcett in 1892 to be a first record for the county. Even if we credit both Roberts' and Austen's discoveries to Hampshire, there can be no doubt about the authenticity of the Charmouth station, vouched as it is by such authority. Unfortunately no specimen seems to have been kept, and the record itself is already forty years old.

Murray (*Fl. Som.*, pub. 1896) writes " of very doubtful occurrence in Dorset," but it is to be presumed that he had not then seen the *Flora of Dorset*, published the year before.

Miss E. Armitage and E. F. Linton in *Fl. Bournemouth* record *Listera cordata* from " Branksome Woods in Dorset." This station was identical with Austen's. In the 2nd ed. of this Flora, published in 1919, Mr Linton did not claim the Lesser Twayblade to be a Bournemouth plant at that time. Mr P. M. Hall tells me that the Branksome woods are full of planted conifers, rhododendrons, etc., and suggests the possibility of our plant having been introduced with young firs. This suggestion is supported by Linton's remark that the colony of *Simethis* in this place—a colony which seems to have disappeared (L. B. Hall, *in litt.*)—was "probably introduced with the *Pinus Pinaster*." Some forty years ago then two stations for *Listera cordata* in the extreme west and east of the county were to be found in Dorsetshire. On the whole—while admitting the possibility of rediscovery—it appears that the species is not to-day a Dorsetshire plant.

HAMPSHIRE.

Both Townsend (*Fl. Hants*, 2nd edition, 1904) and Linton (*Fl. Bournemouth*, 2nd edition, 1919) give Roberts' station, discussed above, from near Boscombe Chine, and about this record there is no uncertainty, but the plant does not seem to have been found there since, *i.e.*, for 80 years. Neither is there any reference in Rayner's Supplement to *Fl. Hants.*

Brockenhurst. Dr W. B Turrill of Kew, in the *Gardeners' Chronicle*, Ser. 3, lxxxv, 164 (1929), wrote " It is worth recording that a specimen of *Listera cordata* collected near Brockenhurst, Hants, June 1927, by R. Findlay, has been received at Kew. The specimen is a small one and the flowers are in bud, but there is no doubt of its identity." Mr Findlay has kindly given me the following particulars of his find. " Five plants were discovered, three in one patch and two about three yards distant. The plants were found in the open heath, some 200 yards from a plantation of Scotch Fir. Only Scotch Fir in the neighbourhood. The spot was rather dry. General plant-association—heather." He adds, " I saw two specimens in 1930—I looked for it in vain in 1931 and 1932, and have come to the conclusion that it has either been eradicated or has disappeared—died out." The whole episode, though full of romance, is too isolated to be of much assistance towards general conclusions. A parallel may be cited. In 1917 a fruiting specimen of *Vaccinium Vitis-Idaea*, previously unknown in Somerset or surrounding counties, was sent me from a wild station on the Quantock Hills. There was no question of the identity of the plant or of the bona fides of the finder. Yet, in spite of immediate and constant subsequent search, no trace of it has since been reported.

CONCLUSIONS.

I have enumerated above the ten stations in the southern counties from which *Listera cordata* has been recorded. The most westerly of these (Morthoe) was probably an error, as were the stations near Sidmouth. Of the remaining eight, the Somerset localities and Codden Hill in Devon certainly supported, and in the case of two Somerset stations, still support, an indigenous plant. It is possible, though not so probable, that *Listera* was native in the other stations. Its diminutive size and retiring nature suggest the probability that it exists elsewhere undetected. Its intermittent appearance—possibly due to prolonged dormancy of the seed—may lead to its rediscovery in known or new stations. Careful consideration of vouched statistics, however, leads to the inevitable conclusion that the species—like *Equisetum variegatum* —is slowly retreating northwards.

W. D. MILLER.

HELPFUL BOOKS FOR FIELD BOTANISTS.

My experience during the past twelve months has strengthened the opinion I have long held, that there is a large and scattered body of intelligent people in this country who are deeply interested in wild plants, are anxious to extend their botanical knowledge, and grateful to anyone who is prepared to help them to do so.

Speaking generally, they have taken up botany as a hobby—many of them realising that a man who retires without a hobby is inevitably shortening his days. To a large extent they are remote from the facilities afforded by public libraries or herbaria, often indeed working alone and under great disadvantage.

In this connection I have been greatly surprised at the number of enquiries received as to the best books for field botanists to use, or for my opinion as to the suitability of a particular book suggested for that purpose. I propose, therefore, briefly to review the existing botanical publications which have been found useful by those wishing to augment their knowledge of British plants. It may, perhaps, be well to add that the opinions here expressed are not based merely upon an examination of the books in question, but more largely on long experience of their use by field botanists of varying attainment.

The first three books are written for those " without any previous knowledge of botany," and, for such readers, indicate " a simple way of finding out the names of common plants."

I. ILLUSTRATED GUIDE TO THE TREES AND FLOWERS OF ENGLAND AND WALES, by H. G. Jameson, M.A. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd., 1925; price, 3/6 net.

II. NAME THIS FLOWER, by Gaston Bonnier. London: J. M. Dent & Sons, Ltd., 1917; 7/6 net.

III. THE BRITISH FLORA, by Gaston Bonnier, adapted to British conditions by Ethel Mellor, D.Sc. London: J. M. Dent & Sons, Ltd., 1925; 7/6 net.

The publication of these three books is evidence of the public demand for aids in the identification of wild flowers, and of the general interest in the study of plants. The " Nature Notes " in our newspapers and " Nature Study " in our schools point in the same direction and support my preliminary premise.

All these publications justify their claim as regards common plants and can be strongly recommended.

I. Those familiar with Mr Jameson's excellent keys and illustrations in the *Student's Handbook of British Mosses* will find in his *Illustrated Guide* the same clearness and brevity of expression in his keys as in the larger work, and his illustrations—though necessarily small because so numerous—are of unusual excellence and accuracy. To give only one instance, his sketch of a single flower of *Thesium linophyllum* (p. 24) represents it more accurately than any other figure I have seen. Nor is this a selected example; it was among a casual test I applied to the book in naming *Crepis biennis, Thesium linophyllum, Sonchus arvensis, Vicia tetrasperma* and *Senebiera Coronopus*. These plants were received one morning for identification and afforded a pretty severe test, which was successfully passed. The book can be strongly recommended and is an excellent introduction to Bentham and Hooker. (See No. VIII).

II. This is a book of somewhat similar character but larger, with more figures and also with 372 coloured drawings of plants drawn to a uniform scale of one-third their natural size. The system of classification is much more complicated than that of No. I, but the coloured plates are extremely useful and I have frequently seen students rightly name most of the common plants they have identified by its use. The book was originally written by Mons. Bonnier in French for use in France, and was subsequently translated and slightly modified by Prof. G S. Boulger for use in this country.

III. This is an entirely different book from No. II, although by the same author, and has been admirably adapted to British conditions by Dr Ethel Mellor. It contains no coloured plates, but over 2000 figures interpolated in the text, just where they are most useful. Its system of classification is that most generally adopted—a General Key for ascertaining the Natural Order, followed by a separate Key to each Order. A most useful book for amateur botanists and I much prefer it to No. II.

IV. JOHNS' FLOWERS OF THE FIELD, revised throughout by Clarence Elliott. Geo. Routledge & Sons. Twelfth edition, 1925; 10/6 net.

"Johns" has for long been in great demand by keen unscientific amateurs. Its 30th edition—entirely rewritten and revised by Prof. G. S. Boulger, was published by the Society for Promoting Christian Knowledge as far back as 1902. Upon a change of publishers in 1911, it was subsequently further revised throughout by Clarence Elliott, and 96 coloured plates—illustrating 268 species—were added. These plates are reproduced from water-colour drawings by Miss Gwatkin, and the separate species are admirably spaced on their respective plates and of great excellence.

There are no keys in the volume, but reliance is placed upon the coloured figures and even more numerous woodcuts accompanying the simple but accurate descriptions of species, for their identification. All necessary botanical terms are most clearly explained and illustrated. In our opinion no single book is more calculated to stimulate and increase a knowledge of British flowering plants than this.

V. WAYSIDE AND WOODLAND BLOSSOMS, by Edward Step, F.L.S., in three volumes, size 6½ × 4½ in., cloth gilt, round corners; each 7/6 net.

Series I—Contains descriptions of 394 species with coloured figures of 127 species, and 150 text illustrations, also a pictorial colour key to the plates.

Series II—Contains descriptions of 349 species with coloured figures of 130 species and 140 text illustrations, also a pictorial colour key to the plates.

Series III—Contains descriptions of 153 species, including all the British Orchids, a special chapter on " What are Orchids?" and coloured figures of 64 species, 87 photographic reproductions and 23 diagrams.

The main purpose of this splendid series of books is to meet the need of those lovers of Nature who have not time to study the more scientific works which have been written for the use of students. Each coloured plate or photographic illustration shows one species only and occupies a whole page. The text is admirably terse, lucid, and accurate. In addition it frequently contains information rarely found in Floras. The late Mr Step's works are so well known and justly famous that our added testimony to their beauty and charm is scarcely necessary.

VI. **Wayside and Woodland Trees**, by Edward Step, F.L.S., complete in one volume, 182 pp., cloth gilt, round corners; 7/6 net.

In this volume all the trees indigenous to the British Islands are described and illustrated by 24 coloured plates and 151 photographic plates. Many of the photographs show the Summer and Winter aspects of the same tree and also large scale representations of the bark, flowers, and fruit. An indispensable book for the identification of our woodland and hedgerow trees.

VII. **Wayside and Woodland Ferns**, by Edward Step, F.L.S. a Guide to the British Ferns, Horsetails and Club-Mosses, with 143 plates, including coloured figures of every species and photographs of the growing plants. Complete in one volume; price 7/6 net. "There have been many books on Ferns, but none so handy, so comprehensive, so beautifully illustrated as this."—*Daily Telegraph*.

We now come to the consideration of the standard Floras used by serious students of British plants. In the following three—VIII, IX, X —each species is very carefully described, but the descriptions given were originally written about 50 years ago and have since been reprinted but never completely revised and rewritten.

VIII. **Handbook of the British Flora**, by Bentham and Hooker. Seventh edition, revised by Dr A. B. Rendle. London: L. Reeve & Co., 1924; 12/- net.

This book has been very widely used both by beginners and students for many years. Undoubtedly the main reason for its great popularity is to be found in its admirable keys. An Analytical Key at the beginning enables the student to ascertain the Family to which his plant belongs. Turning to this in the text he finds a key to the various genera the Family comprises, followed by a key to each genus. By a careful use of these keys the keen student soon finds himself making considerable progress and even when the description of the species shows that he has failed in his diagnosis, the experience gained in retracing his steps by means of the key is of the utmost value. There are no plates in this volume, but these are published separately—*Illustrations of the British Flora*, by Fitch and Smith. L. Reeve & Co.; 12/- net. This is a series of 1321 excellent wood engravings of British plants—with dissections of various parts, most accurately drawn—and is indispensable as a companion volume. (See also No. XI).

IX. Hooker's Student's Flora of the British Islands. 588 pp., 1930; 10/6 net. Macmillan & Co., Ltd., London.

The reputation of this is deservedly high and many eminent authorities still regard it as the best British Flora for botanical students in spite of the many later changes in botanical opinion. The third edition (1884) was allowed to go out of print for a time in the expectation that it would be replaced before long by a revised book based upon Hooker's text. However, the untimely death of Mr C. E. Salmon, who had undertaken this task, put an end to this project, and the third edition is now reprinted without change. We are pleased to know that the book is still available but regret that it has not been thoroughly revised. An admirable and valuable feature of its descriptions is that the *sizes* of the various parts of each plant are given to an extent not found in other Floras. In consequence of the reliability of its text most botanists still use this book as a work of reference.

X. Babington's Manual of British Botany, 10th edition, with amended nomenclature and an appendix, edited by A. J. Wilmott, M.A., 1922, thin paper; 16/- net. Gurney & Jackson, London.

This has long been a great favourite with the serious student of Botany, alike for the excellence of its descriptions and the fullness of its treatment of critical genera. This edition differs from its predecessors—and also from Nos. VIII and IX—in the fact that it is of pocket-size and can be used in the field. The thin paper of its leaves certainly requires care in handling, but it is an enormous advantage to be able to determine your plant while it is still fresh. The nomenclature is brought up to date throughout—an invaluable feature—and the Appendix gives many of the results of recent and reliable systematic work. The price is high, but even if you possess an old edition of the Manual you will be well advised to obtain this 10th and latest edition also.

XI. Hayward's Botanist's Pocket Book, nineteenth edition, edited and revised—with a second appendix of new plants—by the late Dr G. C. Druce, 1930; 5/- net. London: G. Bell & Sons, Ltd.

As its name implies, this is another book for use in the field and is in great favour, so much so, that on botanical excursions I frequently leave my own copy at home, knowing that some of my colleagues will be able to produce it! It has been so frequently reprinted and revised that this latest edition contains much of the most recent opinion. Its nomenclature is sometimes unorthodox, but as a rule synonyms are given which render the identity of the species easy to trace.

XII. FURTHER ILLUSTRATIONS OF BRITISH PLANTS, by Butcher and Strudwick, published by L. Reeve & Co., 1930; 12/- net.

This is a long-needed supplementary volume to the *Illustrations* by Fitch and Smith—see No. VIII. Its figures are much larger—usually full-paged—and invaluable alike for their general excellence and for the fact that most of them are not available elsewhere to the average student. Whatever other Floras you may possess this should certainly be added.

AMENDED DESCRIPTIONS.

Botanists occasionally find their printed descriptions of plants faulty or inaccurate in detail, and at times inadequate through the omission of valuable characters. The necessary corrections or additions are frequently made on the margins of the Floras concerned and would often be of general interest. We shall, therefore, be pleased to publish any such which members may submit. The following list may be found useful or suggestive in this connection.

ABBREVIATIONS.

B. and H. = Bentham and Hooker, *British Flora*, 1924.
Bab. = Babington's *Manual of British Botany*, 1922.
Hook. = Hooker's *Student's Flora*.
Hay. = Hayward's *Botanist's Pocket Book*.
Johns. = Johns' *Flowers of the Field* (C. Elliott).

B. and H. p. 32. *Arabis Thaliana*. "Pods . . . from 4-5 inches long" —inches should be *lines*.

p. 103. *Euonymus europaeus*. " About 3 to 5 ft. high "—up to 20 ft. in N. Lancs woods.

p. 127. *Vicia Cracca*. " Stipules narrow and entire "—often not entire but with one or two minute teeth near the base.

p. 207. *Caucalis Anthriscus*. " Bracts, one close under each ray and often readily distinguished at first sight. Petals pink or white not very unequal in size "—" and " should be " not," and *vice versa*.

p. 234. *Eupatorium cannabinum*. Most easily distinguished when in flower by its very long, deeply cloven and exserted styles.

p. 261. *Carduus palustris*. " Florets purple "—often white.

p. 270. *Hypochaeris radicata*. Leaves blunt and with blunt lobes.

p. 297. *Monotropa Hypopithys*. " The terminal flower has its parts in fours, the lateral ones in fives "—*vice versa*, the terminal flower is the largest and has its parts in fives (10 stamens); the lateral ones in fours (8 stamens). This error also occurs in Bab. 282, but not in Johns' 187.

p. 304. *Anagallis tenella*. Corolla sometimes 6-cleft.

p. 327. *Cynoglossum officinale* has a " mousey " smell.

p. 340. *Linaria minor* is often 9-10 in. high.

p. 355. (Key, fifth line). This would be more useful if stated thus: Calyx irregularly 5-toothed and distinctly 2-lipped, the 3 upper teeth, etc.
p. 363. *Calamintha vulgare.* "Flowers purple"—often rose-red and pale, occasionally white. No bristles under and among the flowers.
p. 407. *Euphorbia Lathyrus*, should be *E. Lathyris.*
p. 440. *Zannichellia brachystemon*—"bracts" should be "backs."
p. 497. *Rhynchospora alba.* "Stems 6 to 9 inches high." Often twice this height: 15-19 inches in Hants.
p. 514. *Carex humilis.* "Male spikelet about 9 inches long"—"inches" should be "lines," the spikelet is very rarely over ¾ inch long.
p. 518. *C. panicea*—(line 16)—"tufts" should be "fruits."

Bab. p. 282. *Monotropa Hypopithys.* "8 stam. in terminal, 10 in lateral fl."—*vice versa*, see B. and H., p. 297 (above).
p. 370. *E. Lathyrus* should be *E. Lathyris.*
p. 436. *Potamogeton natans.* "Peduncle equal"—not so, usually narrowed above.
p. 438. *P. lanceolatus.* Delete "Clare, Galway."
p. 442. *P. rutilus.* Delete "Sussex, Warw. or Staff."
p. 461. *Carex elata*; omit comma after "fertile, spikes," etc.
p. 463. *C. alpina.* The final E should be S.
p. 465. *C. capillaris.* "Roof tufted," should be "Root tufted."
p. 466. *C. humilis.* "With an entire oblique mouth not obovoid"—"not" should be "nut."
p. 471. †††Beak of fr. glabrous—should be glabrous fr.

Hayward. p. 145. 2. (*Veronica officinalis*). Flrs. *not* sessile, but very shortly stalked. (Lines 1 and 2 are contradictory—a "raceme" with "sessile" flowers!). The capsules are not always deeply notched—often truncate or retuse and scarcely notched.

Johns. p. 193. *Erythraea littoralis.* For "turfy sea-cliffs" read "sandy sea-shores and fixed dunes;" the leaves are not "broad" but "narrow;" the flowers are usually arranged in branched and level-topped groups of three.

ZANNICHELLIA.

WILLIAM HARRISON PEARSALL.

The initial difficulty in the classification of the various forms of *Zannichellia* is due to the plants being submerged aquatics and, therefore, not easily procured or kept under observation. It is also by no means easy to reconcile the divergent taxonomic views of authors in this genus, and the difficulty is still further increased by the fact that individual writers have formed different conceptions of the same species—e.g., *Z. pedicellata* Fries.

The leaves of these plants afford little basis for differentiation, the flowers are minute and of short duration, and, therefore, we are not surprised to find that the earliest authors relied mainly upon the fruits as the basis of their classifications. Some later authorities have attached more importance to the flowers in their discrimination of the various species. When, however, either the flowers or the fruits are used as the sole basis of determination difficulties at once arise. In 1861 Gay introduced the two names, *Z. brachystemon* and *Z. macrostemon*, for plants possessing short or long stamens respectively. The anthers of the former were said to be 2-locular, and of the latter 4-locular. These names had a certain vogue in this country and are still to be found in Hooker, Babington, and some county floras. They have, however, long since been shown to be invalid—although Rouy still uses *Z. macrostemon* as the name of one of his races, and states that the filaments of the anthers may very occasionally reach 7 cm. (? 7 mm.) in length. Any classification based mainly on the anthers is quite unreliable, as these may be 2-locular or 4-locular—and either short or long—on different parts of the same plant, are always fugacious and rarely present in dried specimens.

The stigmata are of great diagnostic value, but, unfortunately are in some cases very small, often evanescent and, moreover, become much distorted when dry. Those of *Z. palustris* L. are relatively large, roundish—shaped like a saucer or very shallow funnel—peltate (with the short style attached below like the stalk of a Nasturtium leaf, but obliquely and not at right angles). The margin is usually repand (slightly sinuous) and the surface papillose. Those of *Z. pedicellata* Reichb. are of quite different shape, not round but lingulate or oblong, often relatively long and narrow, with margins sub-entire and surfaces little (or not) papillose. When dried they usually coil up spirally and appear as small knobs at the ends of their long slender styles. Collectors would add greatly to the value of their gatherings by recording the characters of these organs as observed in the living state. The styles are usually described as persistent but in some species they are apparently occasionally deciduous. They afford most valuable evidence, but the comparative lengths of carpel and style should be given only when both are fully mature. It is, however, when we come to consider the fruits that the main difficulty of determination arises. It is a common experience to find fruits sessile, or pedicellate on the same sheet; and the same plant may frequently be found showing both sessile and pedicellate fruits and these may be dorsally weakly crenulate in one case and distinctly spinulose in another. These varying characters are mainly due to the different stages of development of the fruits, which change rapidly and greatly during their later growth. It follows, therefore, that stable determinations can only be given when the plants submitted show perfectly mature fruits in good condition. Much confusion, too, has been caused by the indiscriminate use of the names *pedicellata* and *pedunculata*. Many writers, apparently, still regard these terms as synonymous, but it seems perfectly clear that Fries—at any rate—considered them as being distinct. I append his original description:—*Zannichellia pedicellata* Fries, *Novit. Mant.* I, 18, 1832. Seminibus distincte pedicellatis utrinque obtusis, carina dorsali membranaceo—alata repanda, demum dentato—spinulosa, stylo debili semina aequante. *Z. palustris β pedicellata* Wahl. *Suec.* n. 1011 ? sed umbella nostræ prorsus sessilis. Nostræ multo melius convenit *Z. gibberosa* Reichb. Ic. f. 1006, quam *Z. pedunculata, l.c.*, 1007.

From the foregoing it is clear that the *Z. pedicellata* of Fries possessed " distinctly pedicellate " fruits grouped in an umbel which was " directly sessile " and for that reason " more nearly agreed with *Z. gibberosa* Rchb."—the fruits of which have no common peduncle—"than with *Z. pedunculata*." We also note that at this date (1832) Fries was uncertain whether his plant was the same as Wahlenberg's var. *pedicellata*, but in *Novit. Mant.*, III, 133, 1842, he admits that the names are synonymous, and under his *Z. pedicellata* he also then gives a var. *pedunculata* " fructibus umbellatis pedunculatis " (*Z. pedunculata* Reich.), and a var. *reptans* (*Z. reptans* Wallman).

Z. pedunculata was described by Ludovicus Reichenbach in *Icones Florae Germanicae et Helveticae,* vol. iii, 9-10, 1845, as possessing "floribus pedunculatis, nuculis basi stipitatis, angulo dorsali alatis crenatis." It would appear, therefore, that Reichenbach's name can only be properly applied to plants possessing pedicellate fruits having also a common peduncle.

For more than a century *Z. palustris* L. has been regarded by continental authors as an aggregate species and divided into several others which were considered distinct. While recognising the different forms included under *Z. palustris,* British botanists have been less ready to admit them as being of specific value, and it was only about 50 years ago that Babington first separated *Z. polycarpa* as a distinct species. To-day we have arrived at the stage when both the *London Catalogue* and the *Oxford List* include four species and many varieties. It may, perhaps, be well to state at this point that we do not consider these names to carry much weight in regard to specific distinctions. They have become, increasingly, a convenience for herbarium and exchange purposes, but this has tended somewhat to obscure a proper conception of their relationships. A long acquaintance with British plants of this genus growing under varying conditions has convinced us that all the named species and varieties given in these lists are merely "growth-forms"—conditioned by their environment—of the aggregate *Z. palustris* L.

All these forms fall, more or less naturally, into one or other of two groups possessing in greater or lesser degree the characters briefly summarised in the following table. For convenience of classification and citation—avoiding unnecessary alteration of names—we propose to regard these two groups as *species*. It will be noticed that this classification follows closely that of Ascherson and Graebner—*Pflanzenreich*, IV. 11, 153-156 (1907)—but *Z. gibberosa* is there wrongly given as a sub-var. of *Z. pedunculata*, but as *Z. gibberosa* does not possess a common peduncle to its pedicellate fruits, this classification is impossible. We have also introduced a new variety—*intermedia*—to cover plants frequently met with in nature and not included in existing descriptions. While there is a certain parallelism between the creeping forms of each group. the parallel form in which the groups are presented is not intended to imply a further similarity. Nature usually ignores our imperfect attempts to docket her productions, and we must, therefore, expect to find plants which are not easily classified. In such cases the balance of evidence afforded by the greater number of characters should determine in which group it should be included. In using the table it should be understood that the qualifying terms—long, stout, round, etc.—are relative and not absolute in their significance, and should be compared with the similar terms in the other column.

ZANNICHELLIA.

	Z. palustris (sensu stricto). a. *genuina* Asch. et Gr.	*Z. pedicellata* Fries.
Habitat.	More often in freshwater.	More usually maritime.
Styles.	Short, stout, ± straight.	Long, slender, ± curved.
Stigmata.	Roundish (disc-shaped). Margin sinuous or dentate. Papillose surface.	Oblong, lingulate. Indistinctly so, or sub-entire. Little (or not) papillose).
Carpels.	Sessile or very shortly stalked, 2-3 times as long as the style. Backs usually slightly winged or crenulate.	Longly pedicellate. Sub-equal to the style. Backs normally muricate or even spinulose.
	Var. *major* (Boenn.) Koch. Larger in all its parts.	Var. *gibberosa* (Rchb.). Fruits muricate on both sides.
	Var. *repens* (Boenn.) Koch. Small creeping form.	Var. *reptans* (Wallman). Slender creeping form.
	Var. *polycarpa* (Nolte). Small converging fruits with minute styles.	Var. *pedunculata* (Rchb.). Fruits with a common peduncle.
	Var. *intermedia* var. nov. Fructibus umbellatis pedunculatis, aliter ut in typo.	

Z. PALUSTRIS L. (*sensu stricto*) a. *genuina* Aschers. *Fl. Prov. Brandenb.*, I (1864), 668; Boiss. *Fl. Orient.*, V (1884), 15; Aschers. et Graebn. *Synops.*, I (1897), 362. *Z. dentata* Willd. *Spec. Pl.*, IV (1805), 181.

A slender submerged aquatic species found more often in fresh than in brackish water, but growing in both. Stem filiform or setaceous, articulated, with numerous divaricate branches; light brown when dry. Leaves all submerged, narrowly linear (very rarely to 2 mm. wide), filiform or capillary, usually 1 in.-4 in. long, acuminate or obtuse and mucronate, normally ± opposite in the middle of the stem but often fasciculate (in threes) at its summit; bright green in clear water but usually mud-encrusted in ditches. Stipules small, membranous, intrafoliaceous and adherent to the inside of the sheathing leaf-base. Flowers minute and axillary. Usually there are two or four ovaries together in a cup-shaped sheath or spathe, each possessing a short style and a broad roundish and persistent peltate stigma obliquely disposed at the top. Normally there is also one stamen (in the same or an adjacent axil) having a slender filament of very variable length and a 2- or 4-celled anther divergent (sagittate) at the base. When fully mature the two or four carpels may be sessile or shortly stalked and in very rare cases may possess a short common peduncle. Each carpel is compressed, ± curved, about 2-3 mm. long, reniform, oblong, or semi-lunate in shape, and usually ± tapering to a short stout style approximating to half the length of the carpel. The convex dorsal margin may be ± crenate, muricate or even spinulose, and occasionally also winged.

Var. *major* (Boenningh.) Koch, *Synops.*, I (1837), 679. *Z. major* Boenningh. ex Reichb. in Moessl. *Handb.*, ed. 2, III (1829), 1591; Reichb. *Icon.* (1845), t. xvi., fig. 20, foliis superioribus longissimis, ternis, nuculis subsessilibus, angulo dorsali anguste alato crenato.

Plant in all its parts larger and more robust than the type. Stem usually long and stout. Leaves long, flat, sometimes 2 mm. broad. Fruits usually large, often few in number (2) in each group, shortly pedicellate or subsessile. Otherwise as in the type. Boenninghausen's original type specimen approaches *Z. pedicellata*, according to Graebner, *Pflanzenreich*, IV, 11, 156, 1907.

Var. *repens* (Boenningh.) Koch, *l.c.* *Z. repens* Boenninghausen, *Prodr. Fl. Monast.* (1824), 272; Reichb. *Icon.* (1845), VII, 9, stamine pistilla subaequante, stigmatibus repandis, nuculis sessilibus laevibus aut dorso multicrenulatis.

A small creeping, much branched form, rarely more than 4 in. in length and mostly found in subterrestrial situations such as the margins of shallow ponds. Leaves slender, narrow, often filiform. Fruits sessile or subsessile, smaller than in the type and normally crenulate or muricate on the back.

This is obviously merely an induced state of *Z. palustris* due to uncongenial environmental conditions, but is left here to avoid unnecessary changes in nomenclature. A similar and parallel form—var. *reptans*—occurs under *Z. pedicellata*.

Var. *polycarpa* (Nolte) nob. *Z. polycarpa* Nolte, *Novit. Fl. Holsat.* (1826), 75, nomen nudum, and ex Reichb. *Icones*, VII, 10, 1845, nuculis sessilibus, laevibus, conniventibus, angulo dorsali repando, multidentato, stylo demum abbreviato. Fructus numerosi 6-8 conniventes brevirostres hanc speciem facile distingunt.

This plant has been variously conceived—as species, variety or subvariety, by different authors. Ascherson and Graebner, Rouy and others include it under var. *repens* (Boenn.), and there is much to be said in favour of such an arrangement. In our opinion, however, that variety has always been too highly rated and *polycarpa* is at least its equal in status. In both, the essential characters are those of *Z. palustris*, of which *polycarpa* is the smallest form. Its fruits are usually more numerous than in the preceding varieties 3-6 (8), small, sessile or subsessile, converging, very crenulate, muricate, or dentate on the back, with large repand stigmata, 2-celled anthers and extremely short styles, usually about quarter the length of the carpels. (Babington gives "scarcely ⅙ length of fruit"). Most of the British examples so labelled in herbaria are doubtfully authentic, as they possess divergent fruits nearly smooth on the back and having styles insufficiently short. Nolte, who first used the name *polycarpa*, gives no description of the plant in the *Flora of Holsat.*

Var. *intermedia*, var nov. *Fructibus umbellatis pedunculatis, aliter ut in typo.*

Plants are occasionally found which are intermediate between *Z. palustris* (sensu stricto) and *Z. pedicellata* Fries. They exhibit most of the characters of the former, but possess fruits having a common peduncle, usually short but sometimes long.

Z. PEDICELLATA Fries. *Novit. Mant.*, I, 18, 1832: III, 133, 1842. Koch. *Syn.*, II, 782, 1844. *Z. maritima* Nolte, *Novit. Fl. Holsat.*, 75, 1826 (nomen nudum). *Z. palustris* var. *stipitata* Koch. *Synops.*, I, 679, 1837. *Z. palustris* var. *pedicellata* Wahlenberg et Rosen, *Nov. Act. Upsal.*, VIII, 227, 254, 1821.

This was originally separated from *Z. palustris* as a variety in 1821. Five years later Nolte first published the name as that of a species, but without description. In 1832 Fries gave the description we have already quoted as the earliest available. In the first edition of the *Synopsis* Koch thought the plant a variety of *palustris* but in the second edition of the same work agreed to its specific status being restored.

In more recent times Ascherson and Graebner (*Pflanzenreich*, 1907) give equality of status to the restricted *Z. palustris* and to *Z. pedicellata*. This appears to us a much more natural arrangement than any other and is that adopted in this paper. *Z. pedicellata* differs essentially from *Z. palustris* both in its flowers and in its fruits. It is found in either fresh or brackish water, but much more often in the latter, to which fact, possibly, many of its distinctions are due. Broadly speaking it possesses a tendency to lengthen stigma, style or fruit-stalk; the stigma instead of being roundish (as in *palustris*) becomes oblong, lingulate or even long and narrow (and frequently curved). As a result of this lengthening it is more liable to curl up spirally and become a mere knob easily mistaken for that of *palustris.* Its surface is usually less papillose and its margins less dentate than those of that species. The anthers are most often small, 2-celled and with short filaments, but variable. The style is normally more slender and much longer than in *palustris*—usually about as long as the fruit but often longer and more curved. The fruits are from 2-5 in number (often only 2), ± divaricate, normally strongly crenulate, muricate or even spinulose when fully ripe. They are always distinctly, even longly, pedicellate (stipitate), grouped in an umbel which is " directly sessile," and has no common peduncle. With reference to the name, *Z. maritima*, which is so freely cited in connection with this plant, or *Z. pedunculata*, Nolte gives no description in *Novit. Fl. Holsat.* nor elsewhere, so far as we are aware, and this also applies to *Z. polycarpa*, for which the same reference (p. 75, 1826) is given.

Var. *reptans* (Wallm.) Fries, *Novit. Mant.*, III, 133, 1842, caulibus repentibus radicantibus. *Z. reptans* Wallman in Lindbl. *Bot. Not.*, 1840.

As Fries points out (*l.c.*) this form is analogous to the var. *repens* of *Z. palustris.* Although a parallel form it is quite distinct and by no means synonymous with Boenninghausen's *Z. repens.* It is a very small and slender plant with filiform stem creeping and rooting in subterrestrial habitats but possessing the characters of *Z. pedicellata* and not those of *Z. palustris.*

Var. *pedunculata* (Reichb.). *Z. pedunculata* Reichenbach, *Icones Fl. Germ. et Helv.*, Vol. VII, 9-10, 1845, floribus pedunculatis, nuculis basi stipitatis, angulo dorsali alatis crenatis.

We see no justification for the establishment of this as a species. It is merely a robust form possessing the essential characters of *Z. pedicellata* and in addition its pedicellate fruits have a common peduncle, long or short.

Var. *gibberosa* (Reichb.). *Z. gibberosa* Reichb., *Icones* (*l.c.*), nuculis basi angustato-stipitatis, divergentibus, utroque angulo alato-dentato.

This is a rather rare plant of the E. and S. of England, usually small and slender with divergent pedicellate fruits but having no common peduncle—wrongly included by Asch. & Graeb. (*Pflanzenreich*, 156, 1907) under *pedunculata.* When fully ripe the fruits are strongly crenulate or cristate on both the dorsal and ventral margins. The style often varies on the same plant but is usually nearly or quite as long as the fruit.

This is merely a preliminary paper written to supplement existing descriptions of British authors, to stimulate interest, and to further the study of these plants in their natural habitats. Much field-work has still to be done before we thoroughly understand the natural relationships of the various forms, and members living near water in which these plants are found—usually in profusion—would be making a valuable contribution to scientific knowledge by submitting fresh plants for examination and by recording any exceptional ecological conditions in their environment. (Like most aquatics, they travel quite well if packed, while still fresh, with sufficient damp moss to fill a small tin). In collecting on a larger scale for subsequent drying and distribution, the later the date the better; for herbarium specimens, fully ripe and mature fruits are essential. In all such cases the plants should be properly separated and floated out on to their permanent mounts. A matted mass of inextricably interwoven plants is useless for subsequent examination, and in not a few cases we have found incorrect determinations obviously due to the fact that underlying stems or branches have been mistaken for the peduncles of fruits! It is only fair to add that during the past few years there has been a marked improvement in the quality, beauty and value of the aquatic plants distributed.

RANUNCULUS BULBOSUS L. AND ITS VARIETIES IN GREAT BRITAIN.

ERIC DRABBLE, D.Sc., F.L.S.

Prolonged study of *Ranunculus bulbosus* L. in its native habitats and in cultivation, and a detailed examination of the specimens in the British Museum, in Herb. Druce and in his own herbarium, have led the writer to believe that many of the varieties described in Continental Floras are based on fluctuating variations which cannot be regarded as marking true varieties. In particular, the forms of the fruit (except in var. *valdepubens*) have not been found to go at all generally with other characters used in diagnosis. The work, however, has led to the recognition of certain well-marked and apparently constant varieties under which many of those described and named by earlier writers may be grouped.

The principal names that have been applied to British plants are given in Druce's *List*, ed. 2, thus:—

R. bulbosus L.
  b. *brachiatus* (Schleich.).
  c. *parvulus* Coss. et Germ.
  d. *dunensis* Druce.
  [e. *Aleae* (Willk.) ? Jersey]
  f. *albonaevus* (Jord.).
  ?g. *valdepubens* (Jord.).

The *London Catalogue*, ed. xi, gives only:—

R. bulbosus L.
  b. *valdepubens* (Jord.).
R. Aleae Willk.

A preliminary consideration of these names will clear the way for what seems to the writer a more natural arrangement of the British plants.

By *R. bulbosus* L. in these lists is meant the common inland plant named *R. bulbifer* by Jordan (Diagn., p. 80 (1864)). Here the corm is round and usually not markedly flattened at the top, ⅓-¾ in. in diameter, with one or few stems arising from the top of the corm. *R. bulbosus* L., α *genuinus* Godron Fl. Lorr., p. 23 (1843), described as having "une ou plusieurs tiges naissant du centre d'un bulbe moins gros qu'une noisette," obviously includes this variety, but as Jordan's *bulbifer* refers to the restricted variety after the separation of var. *valdepubens* the names cannot be taken as exactly synonymous, and *bulbifer* must be adopted.

This variety occurs in two forms, differing in the division of the leaf. One of them has the lobes of the ternate leaves broad, with shallow more or less obtuse teeth, the mid-lobe, at least in the lower leaves, sessile or but shortly stalked. This is the form figured in Reichb. Icones 4611, and may be called f. *latisectus* mihi. The other form has the lobes of the leaf deeply cut into narrow segments with acute teeth and the mid-lobe with a (generally long) stalk; this may be called f. *angustisectus* mihi. It does not seem to be identical with *R. bulbosus* L., γ *dissectus* Babey, Fl. Jurass. i, p. 39 (1845), because, although Babey's description " feuilles très découpées à lobes étroits, lancéolés-linéaires," fits our plant, Rouy (*Fl. Fr.*, i, p. 105) says the leaves are " grandes. 2-3 ternées, à lanières linéaires, *épaisses* " and Hegi, Illustr. Fl. v. Mitteleur., iii, p. 557, gives " Laubblätter *dickliche*, mit lineallanzettlicher bis linealen abschnitten." Both these authors seem to indicate a plant with fleshy development of the leaf-lobes, but I have not been able to find a specimen of var. *dissectus* named by Babey himself. These two forms may perhaps grade into one another, though they are usually very distinct and well marked.

R. valdepubens Jordan (Diagn., p. 82) is densely shaggy with long spreading white hairs, the difference from var. *bulbifer* in this respect being very evident when living, and well marked, though less striking in the dried state. Jordan says it differs from *bulbifer* by its very soft and abundant pubescence, beak of carpels longer and more curved, anthers little or not at all curved, leaves with teeth less acute and corm (" bulbe ") more depressed. In Britain it is on the whole a more spreading plant of lower growth than *bulbifer*, the corm is certainly more depressed in well grown inland plants, the teeth of the leaves are shorter and more obtuse than in f. *angustisectus*, and, in all specimens examined, the beak of the carpel was longer and more curved; indeed, *valdepubens* is a readily recognisable variety.

R. albonaevus Jord. is said (Diagn., p. 81) to differ from *bulbifer* by its more robust habit, more abundant villosity, larger leaves all " touchées " with white, larger carpels with longer beak but smaller stigma, and larger and more depressed corms. The plants thus named in Herb. Druce from near Oxford, June 1918, G.C.D., are not abundantly pubescent and cannot be called *albonaevus* Jord.; they are tall well-developed plants of var. *bulbifer*, f. *latisectus*. The same remarks apply to a plant in Herb. Druce named *albonaevus* Jord. by Miss Roper from Redland, Bristol, August 30, 1924 (Ref. No. 20), and rightly rejected by Druce on the very grounds which lead me to reject Druce's own plants. Indeed I have not seen any British specimens that can be thus named. *R. albonaevus* Jord. was probably founded on robust plants of *valdepubens* with white-spotted leaves. This is strongly suggested by Jordan's description and remarks and is borne out by the specimen named *albonaevus* from Caussols, Alpes marit. 28 juin, 1890, ex Herb. Gadeceau in Herb. Mus. Brit. G. C. Druce's and Miss Roper's records prove that white-spotted plants of *bulbifer*, f. *latisectus* occur in this country, and a corresponding form of *valdepubens* may well be expected, but *albonaevus* as a varietal, still less a specific name, can hardly be justified.

A small densely hairy upright plant, 2-3 in. in height, with small flowers, occurring very plentifully on Downs and tops of cliffs in the Isle of Wight is var. *parvulus* Coss. et Germ., Fl. Anal. et descr. des Env. de Paris (=f. *nanus* Druce). Further cultural tests will be made with this plant. The dense hairiness and the relatively long and curved beak of the fruit point to its being a form or ecad of *valdepubens* rather than of *bulbifer* as suggested in Rep. B.E.C., ix, pt. v, p. 735, 1931 (1932). This is rendered the more probable by the fact that both *valdepubens* and *bulbifer* occur inland in the Isle of Wight, and of the two it may well be that the hairy *valdepubens* is the one which has proved so successful as a dwarf form on the Downs and cliffs.

Another densely hairy plant, 3-6 in. in height, with few very large flowers, is var. *dunensis* Druce, described in Rep. B.E.C., ii, p. 495, 1910 (1911), thus:—" *Ranunculus bulbosus* L., var. *dunensis* Druce. Planta 5-10 ctm. alta. Radicibus plurimis ad perpendiculum directis. Cormo robusto, vaginis veterum foliorum dense cooperto. Folia capillis longis albis hirtis densius vestita, praecipue petiolis. Pedunculi breviores 3-5 ctm. Flores magni 2.5-2.8 ctm. Near to *R. valdepubens* Jord., of which it may be a dune form. Differs from *bulbosus* by its shorter growth and larger flowers, its corm being more densely clothed, and the leaves and petioles being covered with long shaggy hairs. Sand dunes, St Ouen's Bay, Jersey, April 1910." I agree entirely with Druce in regarding *dunensis* as a form of *valdepubens* and the relatively long and curved beak of the carpels confirms this. The plant is not confined to Jersey, but occurs also on the south coast of the Isle of Wight, while a plant from Hall Road Dunes, S. Lancs, 30th May 1922, J. A. Wheldon in Herb. Druce, though rejected by Druce, should also be so named.

In the Cambridge British Flora Moss included *R. Aleae* Willk., which he says " is quite a feature on the dunes " in Jersey. Druce failed to find *R. Aleae* there (see Rep. B.E.C., vi, pt. iv, p. 549, 1921 (1922)) and says that he thinks that, from the description of the plant and its habitat, *dunensis* is, at any rate in part, the Jersey *Aleae*. *R. Aleae* is a cormless plant, as is that figured in Camb. Fl., and the text states that the corm is feebly developed or almost absent. Bro. Louis Arsène, in Rep. B.E.C., viii, pt. iv, p. 561, 1927 (1928), states that the plant which is very common, especially on the Quennevais, St Aubin's Bay and St Ouen's Bay . . . . " is certainly not *R. Aleae* Willk., whose stock, though swollen is not bulbous." He writes, " I observed carefully a great number of Jersey plants and never found a single one that was cormless. The assertion of the Cambridge Flora that *R. Aleae* is very common at St Ouen's Bay cannot be true." Druce, on the same page, expresses the opinion that the plant from which *Aleae* of the Cambridge Flora was described " must have been an abnormal plant of *dunensis*." Not one of the many plants I have examined from Jersey and the Isle of Wight is *Aleae*, and for the present, at all events, this name should be removed from the British lists.

A striking variety which seems to be constant in cultivation is characterised by its very large corm from which spring many widely divaricate flowering stems, each of which may itself be swollen at the base in a corm-like manner; one found at Freshwater bore 42 flowering stems on a corm 1.25 in. in height by 1.75 in. in breadth. This is the plant to which the name var. *brachiatus* Schleich. has been applied in Druce's List, following Rouy and Foucaud, Fl. Fr., ii, p. 321, who make *brachiatus* Schleicher synonymous with *macrorhizus* Godron, Fl. Lorr. This synonymy was accepted in the List of Plants from the Isle of Wight in Rep. B.E.C., ix, pt. v, p. 735, 1931 (1932), but further investigation has led to the conclusion that these names are not synonymous. Godron, Fl. Lorraine, ed. i, I, p. 23 (1843), gives "*R. bulbosus* L., *β macrorhizus*. Plusieurs tiges rameuses, naissant de points différents de la surface supérieure d'un bulbe gros comme une noix; plante plus fort" (i.e.. than *α genuinus* Godr.). This description characterises our plant precisely and unmistakably, while *β brachiatus* is described by Gaudin in Fl. Helvet., iii, p. 549 (1828), thus:—"Caule abbreviato, pedunculis longissimis, calyce caduco . . . . Flores in β duplo fere minores pallidioresque" (than in *R. bulbosus* sensu stricto), and in Syn. Fl. Helvet., p. 462 (1834) thus:—"*β brachiatus* humilis, pedunculis elongatis, floribus minoribus pallide luteis, calyce caduco." These descriptions do not indicate our plant, nor does Hegi's in Illustr. Fl. v. Mitteleur., iii, p. 557:—"Stengel verkürtzt, Perianthblätter sehr stark behaart," while the figure of *brachiatus* in Reichb. Icones, xxiii, 4611 b., will not do for *macrorhizus* Godron. The synonymy seems to be wrong, and our plant must be called *macrorhizus* Godron.

On the Downs in the Isle of Wight, growing with f. *parvulus* is another small-flowered plant of similar dwarf growth, but with broader corm and several widely divaricate stems. This has been cultivated for two years in the garden, where it has enlarged considerably and shown itself to be a dwarf state of *macrorhizus*, bearing the same relation to that variety as does f. *pumilus* to var. *valdepubens*. It may be called var. *macrorhizus* f. *minor*.

R. sparsipilus Jord., Diagn., p. 80, said by Rouy and Foucaud to occur throughout France, should be looked for in this country. Jordan says it may be recognised by its low stature and diffuse habit, sparse demi-applied pubescence, somewhat small deep green simply ternate rather obtusely toothed leaves of which the middle division is shortly petiolate, and smaller flowers than in *bulbifer*. The following specimens in Herb. Mus. Brit. are delicate, sparsely hairy plants, with small, very "cleanly" divided ternate leaves with the mid-lobe ± stalked:—(1) Billot, *Flor. Gall. et Germ.* Exsicc. No. 3505; *Ran. sparsipilus* Jord.!, bords de l'Yèvre (Cher), 15 mai, 1865. A. Déséglise; and (2) Herb. Gaston Genevier, *Ran. sparsipilus* Jord., Berthelieu, 9. 11, and 12 mai, 1866 (three gatherings on two sheets).

A few unusual forms may receive passing notice. (1) An apetalous plant of var. *macrorhizus* from Finchley, Middlesex, May 1913. E. and H. D. in Herb. Drabble, normal in all respects except in the absence of petals; (2) an apetalous plant with finely segmented leaves and nearly sessile flowers from Dartford Heath, Kent, St John Marriott, 1924, in

Herb. Drabble, named by Druce f. *apetala* in Rep. B.E.C., vii, pt. iii, p. 431, 1924 (1925); (3) a slender upright plant of var. *bulbifer*, f. *angustisectus* with very pale sulphur-coloured flowers, Abberley Hills, Worcestershire, Miss Agnes Wilkinson, May 1924, in Herb. Druce, named by him f. *sulphurea* in Rep. B.E.C., vii, pt. iii, p. 431, 1924 (1925); (4) "double"-flowered plants of var. *bulbifer*, f. *latisectus* from Eastbourne, June 1909, Miss Trower, and of f. *angustisectus* from Askam, v.c. 69b, D. Lumb, June 15, 1914, both in Herb. Druce.

The foregoing discussion leads to the conclusion that we have in this country three well-marked varieties:—

(α) var. *bulbifer* Jord.
(β) var. *valdepubens* Jord.
(γ) var. *macrorhizus* Godron,

and that the other named plants may be regarded as forms, or some of them as ecads, of these three. The British plants may therefore be arranged as follows:—

RANUNCULUS BULBOSUS L.

(α) Var. BULBIFER (Jord.). *R. bulbifer* Jordan, Diagn., p. 80 (1864); *R. bulbosus* L., α *genuinus* Godron, Fl. Lorr., p. 23 (1843), p.p.; *R. bulbosus* L., " forme " *bulbifer* (Jord.), Rouy and Foucaud, Fl. Fr., i, p. 105 (1893).

Plant upright, 12-15 in. in height, corm ¼-¾ in. in diam., usually not flattened above, with one or few stems arising at the top of the corm; stems and petioles hairy, hairs spreading or ± adpressed on the stem above; leaves ternately compound, the lobes again divided, usually more deeply in the upper leaves, sometimes touched with purple or white. The commonest variety, generally abundant.

Forma *latisectus* mihi; lobes of the leaves broad, lateral lobes sessile, mid-lobe sometimes with a short stalk, upper leaves more deeply divided with mid-lobe usually stalked, lateral lobes generally sessile; segments of the lobes short broad and sub-obtuse; carpels c. 3 mm. in diam., with short beak. Reichb. Icones 4611.

Exsicc.—*R. bulbosus* L., var. *bulbifer* Jord., f. *latisectus* Drabble. (i) Moons Hill, I. Wight, June 1930; (ii) Wigton, Cumberland, J. Parkin; both in Herb. Drabble.

Apparently common and widely distributed. Specimens have been seen from Isle of Wight, Sussex, Surrey, Middlesex, Berkshire, Oxfordshire, Buckinghamshire, Gloucestershire, Lancashire, Cumberland.

Forma *angustisectus* mihi; leaves deeply lobed, mid-lobe generally long-stalked, lateral lobes usually shortly but distinctly stalked, all the lobes of the upper leaves often very long-stalked; segments of the lobes long, narrow and acute; carpels c. 2.75 mm. in diam., with short beak.

Exsicc.—*R. bulbosus* L., var. *bulbifer* Jord., f. *angustisectus* Drabble, Moons Hill, I. Wight, 1930, in Herb. Drabble.

Probably common and widely distributed. Specimens have been seen from Isle of Wight, Hampshire, Surrey, Essex, Berkshire, Gloucestershire, Worcestershire, Shropshire, Lancashire, Sutherland.

(β) Var. VALDEPUBENS (Jord.). *R. valdepubens* Jordan, Diagn., p. 82 (1864); *R. bulbosus* L., "forme" *valdepubens* (Jord.), Rouy and Foucaud, Fl. Fr., i, p. 105 (1893).

Plant upright, usually less tall than *bulbifer* and with the leaves more widely spreading; corm typically flattened above, c. 5/16ths in. in height by 5/8ths in. in breadth, stems one or few from the top of the corn; stems, peduncles and petioles shaggy with a dense coat of long spreading white hairs; lobes of the leaves with rounded outline, all deeply divided into short broad segments with short obtuse teeth, mid-lobe usually long-stalked; carpels in inland plants c. 3 mm. in diam., with beak longer and more curved than in var. *bulbifer*.

Exsicc.—*R. bulbosus* L., var. *valdepubens* (Jord.), Moons Hill, I. Wight, May 1930, E. and H. D., in Herb. Drabble.

Specimens have been seen from Jersey, Isle of Wight, Berkshire, Oxfordshire, Derbyshire.

Forma *dunensis* Druce; *R. bulbosus* L., var. *dunensis* Druce, Rep. B.E.C., ii, p. 493, 1910 (1911); *R. Aleae* Moss, Camb. Brit. Flora, iii, p. 134, *non* Willk.

Plant of low growth, 3-4½ in. in height (including the flower-stalks) with well developed corm, flowering stems short with few large flowers often 1 in. in diameter; stems, peduncles and petioles clothed with shaggy white hairs; carpels 2-2.5 mm. in diam., with longer and more curved beak than in var. *bulbifer*.

Exsicc.—*R. bulbosus* L., var. *dunensis* Druce, sand dunes, St Ouen's Bay, Jersey, April 1910, G.C.D. in Herb. Druce (type); *R. bulbosus* L., var. *valdepubens* (Jord.), f. *dunensis* Druce, Afton Downs, I. Wight, 1931, E. and H. D. in Herb. Drabble.

Specimens have been seen from Jersey, Cornwall, Isle of Wight, and S. Lancashire.

Forma (vel ecad) *parvulus* Coss. et Germ.; *R. bulbosus* L., var. *parvulus* Coss. et Germ., Fl. Anal. et descr. des Env. de Paris; *R. bulbosus* L., f. *nanus* Druce (? nomen nudum vel ined.).

Plant small, upright, 2-3½ in. in height, with one or few flowers, densely hairy stems and petioles, small leaves and flowers (7/10th in., sometimes a little larger); carpels c. 2 mm. in diam., with relatively longer and more curved beak than in var. *bulbifer*.

Exsicc.—*R. bulbosus* L., var. *valdepubens* (Jord.), f. *parvulus* Coss. et Germ., Downs above Compton Bay and Freshwater, I. Wight, June 6, 1929, E. and H. D. in Herb. Drabble; *R. bulbosus* L., var. *minor* Druce, Barmouth, W. Pamplin, 1885, in Herb. Druce; *R. bulbosus* L., Alum Bay, I. Wight, May 10, 1899, G.C.D. (as ? *dunensis*) in Herb Druce.

Specimens have been seen from the Isle of Wight and Merionethshire.

(γ) Var. MACRORHIZUS Godron, Fl. Lorraine, ed. i, I, p. 23 (1843). *R. bulbosus* L., "forme" *bulbifer* (Jord.), *β brachiatus* Rouy and Foucaud, Fl. Fr., ii, p. 321, *non* Schleicher.

Corm very large, up to 1.25 in. in height by 1.75 in. in breadth, bearing many widely divaricating or almost prostrate stems springing from the upper surface of the broad flattened corm, each stem often swollen at its base into a small corm. In the Isle of Wight plant the leaves, except a few of the lowermost, are divided into narrow segments and all the lobes of the stem-leaves are long-stalked; carpels 2.5-3 mm. in diam., more numerous and with longer beak than in var. *bulbifer*.

Exsicc.—*R. bulbosus* L., var. *macrorhizus* Godron, Moons Hill, Isle of Wight, June 1930, E. and H. D. in Herb. Drabble.

Specimens have been seen from the Isle of Wight and Middlesex.

Forma (vel ecad) *minor* mihi. On the Downs in the Isle of Wight var. *macrorhizus* occurs as a small form 2-3 in. in height with widely spreading prostrate stems and small flowers, bearing the same relation to typical *macrorhizus* as does f. *parvulus* to typical *valdepubens*.

Exsicc.—*R. bulbosus* L., var. *macrorhizus* Godron, f. *minor* Drabble, Freshwater Downs, I. Wight, June 1930, E. and H. D. in Herb. Drabble.

Hitherto seen only from the Isle of Wight.

The British list may now stand thus:—

Ranunculus bulbosus L.
    α Var. *bulbifer* (Jord.).
        f. *latisectus* Drabble.
        f. *angustisectus* Drabble.
    β Var. *valdepubens* (Jord.).
        f. *dunensis* Druce.
        f. *parvulus* Coss. et Germ.
    γ Var. *macrorhizus* Godron.
        f. *minor* Drabble.

VALERIANA OFFICINALIS L. AND ITS ALLIES IN GREAT BRITAIN.

Eric Drabble, D.Sc., F.L.S.

Shortly before his death I received from Dr Druce a letter in which he asked me to examine all his specimens of *Valeriana officinalis*; he thought there was a new variety amongst them and invited my opinion. This request has directed my attention to the genus and it has become clear that a re-grouping of the British plants included in *V. officinalis* in the broad sense is necessary.

The London Catalogue, ed. xi, gives
    Val. officinalis L. (*Mikanii* Syme).
    Val. sambucifolia Mikan.
In Druce's *List*, ed. ii, we find
    Val. officinalis L. (*officinalis*, var. *Mikanii* Syme).
        b. *latifolia* Vahl.
    Val. sambucifolia Mikan.

A study of the specimens in public and private herbaria shows that there has been great difference of opinion and much uncertainty about the limits of the two species recognised in both Lists. This is largely due to the confusion wrought by H. C. Watson in *Comp. Cybele Brit.*, pp. 449-451, and to a lesser degree by other writers. It has been found that the name *Mikanii* has been applied to two distinct plants, *Valeriana angustifolia* Host, and the form of *V. officinalis* with narrow leaflets, while under the name *V. sambucifolia* have been confused the form of *V. officinalis* with broad leaflets and the true *V. sambucifolia* Mikan.

The examination of a very large amount of material has led to the following grouping:—

1. *Valeriana angustifolia* Host.
2. *Valeriana officinalis* L.
3. *Valeriana sambucifolia* Mikan.

1. Valeriana angustifolia Host.*

Val. angustifolia Host, Fl. Austr., i, p. 36 (1827).
Val. officinalis L., γ *tenuifolia* Vahl, Enum. ii, p. 6 (1806).
Val. angustifolia Tausch in Reichb. Icones, 728 (1850).
Val. officinalis L., var. *minor* Koch, Syn. Fl. Germ., ed. 3, p. 359 (1857).
Val. officinalis L., var. *Mikanii* Syme, E.B., ed. 3, iv, p. 236 (1877) p.p.
    (The added leaf in plate 698 is *angustifolia*).
Plate:—Reichb. Icones, dccxxviii, 1433.

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*This is generally given as *V. angustifolia* Tausch, Hort. Canal., but I have failed to find any reference to it in Tausch, Hortus Canalius, 1823. The first description seems to be that by Host.

Stem with spreading hairs or nearly glabrous; leaves pale green, drying yellowish, leaflets usually 15-19, of the lower leaves entire narrow linear-oblong parallel sided obtuse scarcely narrowed to the base strongly decurrent, of the stem-leaves narrowly linear-lanceolate acute or subacute entire (or rarely with few sometimes well developed teeth) narrowed at each end sessile and decurrent, terminal leaflet little or not at all broader than the others; stolons usually short or absent; fruit triangular with straight sides abruptly truncate below, length in specimens measured 3-4.5 mm.

Host (*loc. cit.*) gives " germen . . . hispidulum;" specimens in Herb. Mus. Brit. show clearly that the mature fruits may be either glabrous or hairy.

Exsicc. : —

In Herb. Mus. Brit. : —

- *V. angustifolia* Tsch., Mt. Reculet (Jura), 20 juillet, 1862, J. C. Ducommun.
- *V. officinalis* L. Vizcaya, Guipazcoa, Navarra, Majo, Juno 1850, Wilkomm, It. Hisp. secund. 80.
- *V. angustifolia* Tausch, Hungaria, Budapest, Wolfsthal (n.d.), Steinitz.
- *V. angustifolia* Tausch, Cher, St Florent, 20 juin 1864, A. Déséglise.
- *V. collina* Wallr., forma *angustifolia* Tsch., Monte Generoso, Tocino, Switzerland, July 1886, R. P. Murray.
- *V. officinalis* L. In subhumidis prope Jarlosa Uplandiae, juin 1865, F. Ahlberg.
- *V. officinalis* L., Bois de Boulogne, 7 juin 1841, Bourgeau.
- *V. officinalis* L., in Monte Jumrukcal, 19/8/1907, C. K. Schneider, Iter. balcan., 1907.

In Herb. Drabble : —

- *V. angustifolia* Host, near Guildford, Surrey, May 1903, E.D.

In Herb. Druce : —

- *V. officinalis* L., Hermitage, Berks, August 1895, G.C.D.
- *V. officinalis* L. (a) *Mikanii* (Wats.), How Wood, Littlebury, Essex, 8 July, 1893, A. H. Wolley-Dod.
- *V. officinalis* L., *β minor* Koch, Dove Dale, Derbyshire, n.d.
- *V. Mikanii* Syme, extreme variety; origin Wyndcliff, Monmouth, Cult. 7 July, 1899, Augustin Ley.
- *V. officinalis* L., root brought from Dovedale, Derbyshire, and flowered in the garden at Alstonfield Vicarage, n.d.

2. VALERIANA OFFICINALIS L.

Val. officinalis L., *α major* Koch, Syn. Fl. Germ., ed. 3 (1857).
(Including *Val. pratensis* Dierb., Syst. Heidelb., p. 71 (1827) and *Val. officinalis* L. in Syme E.B., ed. 3, iv, 236 (1877) p.p.

Plates:—Reichb. Icones dccxxvii. 1432; E.B., 698 (excluding the added leaf in ed. 3).

Stem densely hairy or almost glabrous except at the nodes; leaves darker green than in *V. angustifolia*; leaflets narrowed to the base, the upper ones often decurrent on the rachis, varying in number, generally 15-17, those of the lower leaves usually larger and broader, all toothed, often on both edges, usually more abundantly on the basiscopic margin, acroscopic margin sometimes entire, ovate-lanceolate to linear-lanceolate acute or acuminate, terminal leaflet not much larger than the rest, often no larger, acute; stolons usually short; fruit triangular with straight sides, abruptly truncate or even cordate below, 4-5 mm. in length.

(a) Forma DENTATIFOLIA Druce.

Val. officinalis L., var. (or sub-sp.) *dentatifolia* Druce, Rep. B.E.C., ix, pt. v, p. 558, 1931 (1932).

Val. officinalis L., var. *Mikanii* Syme, E.B., ed. 3, iv, 236 (1877) p.p.

Val. Mikanii Watson, Comp. Cybele Brit., p. 523 (1877).

Val. officinalis L., Spec. 45. (The specimen of *Val. officinalis* in the Linnean Herbarium, though very incomplete, showing only the upper part of the stem and a few pairs of leaves, is apparently f. *dentatifolia*.)

Plate:—Butcher & Strudwick, Further Illustrations, 213 (as "*V. officinalis* L. = *Mikanii* Syme").

Leaflets linear-lanceolate, toothed on both margins or with the acroscopic margin entire or subentire, terminal leaflet especially of the stem-leaves narrow, often but little toothed, not broader, often narrower than the lateral ones.—Common.

Type:—*Val. officinalis* L., var. *dentatifolia* Druce, Ashdown, Berks, August 1931, G. C. Druce, in Herb. Druce.*

Exsicc.:—

In Herb. Mus. Brit.:—

- *V. excelsa* Poir., Blek (Flora Suecica), G. Johansson, 8/8/1915.
- *V. excelsa* Poir., Plantes des Certagne, 1926-29, vii, F. Sennen.
- *V. officinalis* L., Scania, July 1899, Plantae Scandinavicae, Kristian Roth.
- *V. officinalis* L., in silva Baumgarten prope Bern, 10 juillet, 1868, R. J. Shuttleworth.
- *V. officinalis* L., Herb. Florae Ingricae, 294, Cent. ii, 1860.

In Herb. Drabble:—

- *V. officinalis* L., f. *dentatifolia* Druce, Reigate Heath, 1875 (as *V. officinalis*), H. E. Wilkinson.
- *V. officinalis* L., f. *dentatifolia* Druce, Darley Dale, Derbyshire, 1906, E. Drabble.

In Herb. Druce:—

- *V. officinalis* L., Margot Wood, Cornwall, July 1904, G.C.D
- *V. officinalis* L., Radway Wood, 1863, T. Busby.

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*Not all (? none) of the plants distributed in 1931 (*B.E.C.*, ix, pt. vi, p. 830) as *V. officinalis* L. var., Ashdown, Berks, June 20, 1931, are *dentifolia*. My specimen, generously given to me by Mr P. M. Hall, is *V. angustifolia* Host.

(β) Forma LATIFOLIA Vahl.

Val. officinalis L., var. *latifolia* Vahl, Enum., vol. 2, p. 6 (1806).

Figure:—Illustr. Brit. Fl., Fitch & Smith, ed. 4, fig. 486 (1897) (as *V. officinalis*).

Leaflets lanceolate to ovate-lanceolate acute or acuminate, toothed on both margins, the acroscopic sometimes with few teeth, occasionally entire, terminal leaflet as large as or larger than the others, acute.—Common.

Exsicc.:—

In Herb. Mus. Brit.:—

- *V. sylvestris* major, folio lucido, n.d., H. R. Par.
- *V. procurrens* Wallr., bords de la Loire près Vevers, juillet 1860, A. Déséglise.

In Herb. Drabble:—

- *V. officinalis* L., var. *latifolia* Vahl, Linacre Wood, Derbyshire, 1906, E.D.
- *V. officinalis* L., var. *latifolia* Vahl, Carlisle, June 1872 (as *officinalis*), Claude Prescott.

In Herb. Druce:—

- *V. sambucifolia* Mikan, side of Canal near Harefield, Middlesex, 20/5/08, A. Loydell.
- *V. officinalis* L., *sambucifolia* Watson, Caithness, July 1920, G.C.D.
- *V. officinalis* L., Cheddar Cliffs, Somersetshire, C. E. Palmer, June 8, 1895.
- *V. sambucifolia* auct. angl., near Odiham Castle, July 22, 1883, C. E. Palmer.
- *V. officinalis* L., *sambucifolia?*, Surrey, Bog near Erith Hill by Godalming, 1867, H. C. Watson.
- *V. officinalis* L., *Mikanii* Syme E.B., Erith Hill by Godalming, on dry ground, 1867, Hewitt C. Watson.

3. VALERIANA SAMBUCIFOLIA Mikan.

Val. sambucifolia Mikan ap. Pohl, Fl. Böhm., i, p. 41 (1809).

Val. officinalis L., var. *sambucifolia* Syme, E.B., ed. 3, iv (1877), p.p., (sed non tab.) non *Val. sambucifolia* Watson, Comp. Cybele Fl. Brit., p. 523.

Plate:—Reichb. Icones, dccxxvi, 1431.

Plant tall, stem hairy, leaves dark green, lower ones large; leaflets usually but not always fewer (7-11, but sometimes more) and larger than in *officinalis*, f. *latifolia*, broadly lanceolate or ovate, toothed on both margins, terminal leaflet larger than the rest and with very broadly rounded apex which bears large teeth of which the uppermost are often as long as, or nearly as long as the apex which is usually obtuse; stolons long; fruit narrower, more ovate-lanceolate and less triangular than in *officinalis*, with rounded base, not abruptly truncate or subcordate, 3-4 mm. in length in the specimens measured.—Not common.

Exsicc.:—

In Herb. Mus. Brit.:—

V. sambucifolia Mik., Reichenberg, 1855.

V. sambucifolia, Sommerfeld b. Frankfurt, Baenitz ex herb. B. Auerswald.

V. officinalis L., Lars, Plantae Caucasicae, 25/5/81, A. H. and V. F. Brotherus.

In Herb. Drabble:—

V. sambucifolia Mikan, Monsal Dale, Derbyshire, 9/32. E. and H. Drabble.

V. sambucifolia Mik., Cleeve Bank, Ross, August 19, 1852, Mr Purchas.

In Herb. Druce:—

V. officinalis L., var. *sambucifolia* Mik., Tynnington Woods, E. Lothian, July 1875, G.C.D.

A complete history of the treatment of these plants by British authors will not be attempted, but some reference to the more important accounts may be given.

Smith, Engl. Fl., i, 43 (1824), gives one species, with a variety *V. sylvestris major montana*, but whether he included *sambucifolia* under *officinalis* with broad leaflets is not clear.

Babington, Man., ed. 2, 1847, gives:—

(1) "*V. officinalis* (L.) leaflets in 7-10 pairs, lanceolate dentate-serrate, terminal one not larger than the others. . . . Roots with scions." For this he quotes E.B. 698 and Sturm's Deutschlands Flora, 9, thus making it clear that he referred to *V. officinalis* L. sensu stricto, and not to *V. angustifolia* Host. (2) "*V. sambucifolia* 'Mikan;' leaflets dentate-serrate in 4-5 pairs, of the radical l. ovate-acute, of the stem l. oblong-lanceolate, terminal leaflet not larger than the others. . . . Root with scions." He says, "My specimens exactly accord with Bohemian ones from Tausch." It appears that he here included true *sambucifolia*, but he does not seem clearly to have distinguished it from *officinalis*, f. *latifolia*.

In Ed. 6, 1867, he gives:—

(1) "*V. officinalis* (L.); leaflets 9-11 lanceolate dentate-serrate, terminal one not larger than the others . . . fr. glabrous ovate oblong . . . *With suckers not stoles.* Lts. usually 9-11 near together, anterior edge nearly entire, posterior strongly toothed," and he quotes Reichb., 727 (which is *officinalis*). Here again he did not recognise *V. angustifolia*. (2) "*V. sambucifolia* ('Mikan') lts. 9-11 dentate-serrate of the radical l. ovate-acute of the stem l. oblong lanceolate, terminal lt. not larger than the others . . . fr. glabrous ovate attenuate . . . with long stoles, lts. toothed on both edges, term. lt. of rt. l. sometimes slightly larger than the others," and for this he quotes Reichb., 726, which is true *sambucifolia*. However, although he included *sambucifolia*, it seems clear that he did not exclude *officinalis*, f. *latifolia*. Curiously he does not quote E.B., 698, for either species in ed. 6.

In Ed. 8 there is a similar failure to discriminate between *sambucifolia* and *officinalis*, f. *latifolia.* Only one species is now given, *V. officinalis*, and for this reference is made to Reichb., 727. This is subdivided into "α lts. usually 9-11, near together, their anterior edges nearly entire, their posterior edges strongly toothed," and "β *V. sambucifolia* (Mikan); lts. of rt. l. ovate acute of st. l. oblong lanceolate, all toothed on both edges. . . . Term. lt. of rt. l. often slightly the largest, stoles long," and he quotes for this E.B., 698, which is not *sambucifolia*, but *officinalis.* Here it is quite evident that *V. angustifolia* is not included under α, while the reference to E.B., 698, shows an entirely erroneous conception of *sambucifolia.*

Nothing was done in the re-edited ed. 9 to improve this unsatisfactory treatment, the only change being the transference of "*with suckers* not stoles" from the general description to α, which certainly gave no help. It is a remarkable fact that in none of these editions does Babington refer to Reichb., 728, and we cannot say that he ever recognised *angustifolia.*

Before dealing at some length with H. C. Watson's treatment of these plants, reference may be made to certain other writers.

Syme, E.B., ed. 3, iv, 236 (1877), gives *Mikanii* with 6-10 pairs and *sambucifolia* with 4-6 pairs of leaflets. The plate of the previous edition, 968, which is *officinalis* L. sensu stricto, was used, but a leaf of *V. angustifolia* was added to represent *Mikanii* (see Gurney, Notes on Drawings, 1905). It seems, then, that the original plate depicts what Syme, quite erroneously, regarded as *sambucifolia* and that "*Mikanii*" would cover the plants now recognised as *angustifolia* Host; but the one leaf of *Mikanii* drawn is insufficient evidence that he excluded *officinalis*, f. *dentatifolia.* Watson raised the name *Mikanii* to specific rank, though he intended by this *V. officinalis*, f. *dentatifolia* and not *V. angustifolia* as will be shown below. Fortunately Watson's error need not continue to confuse nomenclature, as *Mikanii* had previously been given to a Guatemalan species.

The most interesting fact in Syme's treatment is that he really recognised the existence of *angustifolia* in Great Britain though he failed to separate it from the form of *officinalis* with narrow leaflets. His definite application of the name *sambucifolia* to the common form of *officinalis* with broad leaflets was an error which has caused much confusion; indeed Syme left the matter in a far worse condition than that in which he found it after Babington's treatment.

Hooker, Student's Flora, ed. 3, 1884, gives "*V. officinalis* proper (*V. Mikanii* Wats.) leaflets 6-10 pairs, toothed on one side," and "var. *V. sambucifolia* Mikan, leaflets 4-6 pairs, toothed all round." This, of course, does not distinguish between *officinalis* and *sambucifolia*, and leaves *angustifolia* quite unrecognised.

W. H. Beeby, Journ. Bot., 314, 378, 1888, states that the colour of *officinalis* (*Mikanii*) is a bright clear green like *Cardamine amara*, and *sambucifolia* a dark opaque bluish green. This suggests an acquaintance with *angustifolia*, but he does not clearly separate it from *dentatifolia*, while *sambucifolia* is insufficiently characterised. The fruit of *sambucifolia*, he says, is larger and considerably broader at the base in proportion to the apex than that of *officinalis*. This does not at all conform to my experience. I find the fruit of *sambucifolia* to be rather the smaller, much less broadened and more rounded below, and this is in accordance with Reichenbach's figures, so here again we seem to find confusion between f. *latifolia* and *V. sambucifolia*.

F. N. Williams, Prodr. Fl. Brit., 202, gives two species, (1) *Val. officinalis* with two varieties, (a) *tenuifolia* Vahl and (b) *latifolia* Vahl; and (2) *Val. sambucifolia* Mikan. The mention of *tenuifolia* is interesting, as this is generally regarded as synonymous with *angustifolia* Host, but the real differences between *angustifolia*, *officinalis* and *sambucifolia* are not clearly emphasised.

Watson's treatment in Compend. Cybele Brit., 1870, has been left to the last because of his references to other authors. On p. 523, he gives specific status to *Mikanii* Syme and says that *sambucifolia* is simply " a second name for the ordinary or usual form of Linnean *V. officinalis* in Britain and elsewhere." It would be difficult to find a short sentence more crowded with errors. The plant which he called *V. Mikanii*, as will be shown below, was simply the form of *officinalis* with narrow leaflets, which is quite unworthy of specific and doubtfully even of varietal rank, while he evidently identified *sambucifolia* with *officinalis*, f. *latifolia*, *i.e.*, the common form of that species in Britain. Watson, therefore, makes two *species* of these two *forms*, and his treatment of them and also reference to his own specimens (see below), shows no knowledge of *angustifolia* or of true *sambucifolia*. On the basis of this misconception he makes an attack on Babington (pp. 448-451) in which the very meagre extent of his acquaintance with *Valeriana* in this country is exposed in almost every statement. On p. 449 he writes " the author of the ' Manual ' foreshadowed an innovation in his first edition and carried it into effect in his second. He did so with a neglect of his English predecessors in favour of anything foreign which he had almost promised us on the first page of his first Preface. And here . . . an ill-considered foreign importation has thrown our nomenclature into confusion. In that second edition an alleged species is disjointed from *Valeriana officinalis* under the name of " *sambucifolia* (' Mikan ')." This, Watson says, was only repeating in topsy turvy manner the distinction made by Smith and others, " converting the second species or variety into the type and the type into the variety; disguising the real character of the change by help of the new foreign name *sambucifolia*." He continues " Thus when botanists were told of a supposed second species, under the new name *sambucifolia*, they compared specimens of the imagined novelty with specimens of the same thing under its old name *officinalis*. Of course they were only mystified by an attempt to enlighten them which was so badly carried out. The matter has remained in this confused condition up to its latest and sixth edition; very likely it has so remained because the Author of the book has never yet clearly understood his own handiwork."

Now Babington seems really to have seen *sambucifolia*—he refers to Reichb., 726, in Ed. 6, to which edition Watson's remarks apply—though he did not sufficiently distinguish it from *officinalis*, f. *latifolia* Vahl. (The position of his reference to E.B., 698, in eds. 8 and 9, must be a slip, or else an unwise following of Syme, E.B., ed. 3.) Watson, however, evidently had no knowledge of *sambucifolia* and quite gratuitously assumed that Babington referred only to the form of *officinalis* with broad leaflets. Watson's remarks appeared in 1870; Reichenbach in 1850 had published excellent figures which make abundantly plain the difference between these plants, and reference to them should have shown Watson his error and might possibly have prevented his most uncalled for attack. But this is not all; Watson (p. 451) writes " *Sambucifolia*, the form with 4-6 pairs of broad leaflets, is more especially the plant of ditches and watery places, while the other form, that with usually more numerous and narrower leaflets, is the plant of the less humid places. The difference is conspicuously shown near Godalming in Surrey, for instance, where the narrow-leaved form is plentiful among nut-bushes on a sandstone hill infiltrated with chalk, known as Frith Hill; while the broad-leaved *sambucifolia* alone grows in a damp bog at its base, among alder bushes and various swamp plants."

Fortunately we are left in no uncertainty as to the plants to which Watson refers. In Herb. Druce are the following sheets:—(a) " *Valeriana officinalis* L.—*Mikanii* Syme E.B., Erith Hill, by Godalming on dry ground, Hewitt C. Watson, 1867." (b) " *Valeriana officinalis* L.—*sambucifolia?* Bog near Erith Hill by Godalming, 1867, H. C. Watson." Both these sheets are *officinalis* sensu strictò, and though one of the bog plants has broader leaflets than that from the dry ground, another of them is not noticeably different in this respect; thus even the differences stated to be shown between his bog and drier-ground plants are not substantiated by Watson's specimens, while certainly the bog plants do not even remotely approach *sambucifolia.* Yet on such material as this Watson based his attack on Babington. It is unpleasant to have to re-open old quarrels, but it is high time that Watson's work received more critical attention, and it would be unjust on the present occasion not to clear the memory of Babington from this ignorant attack.

After Watson's contribution it is a relief to turn to the work of two men who have helped towards a more correct understanding of these plants. These are F. N. Williams and G. C. Druce.

Williams, by his recognition (Prodr. Fl. Brit., p. 202) of *Val. officinalis*, var. *latifolia* Vahl in addition to *V. sambucifolia*, showed the way to a clearer understanding of the latter plant, while Druce, by describing *Val. officinalis*, var. *dentatifolia* in Rep. B.E.C., ix, pt. v, 558, directed attention to the form of *officinalis* with narrow leaflets, which is quite distinct from *Val. angustifolia* Host, but which, curiously enough, appears to be the *Val. officinalis* of the Linnean Herbarium.

DISTRIBUTION.

It is not possible at present to give a full account of the distribution of these Valerians in Great Britain, but the evidence so far available goes to indicate that *V. angustifolia* is decidedly rare though widely distributed, *V. officinalis* common generally in both its forms, and *V. sambucifolia* far less common and perhaps very rare. Specimens have been seen from the following counties:—

V. angustifolia Host.—Somerset, Wiltshire, Sussex, Surrey, Essex, Hertfordshire, Berkshire, Buckinghamshire, Northamptonshire, Gloucestershire, Monmouthshire, Herefordshire, Warwickshire, Staffordshire, Lincolnshire, Derbyshire, Orkney.

V. officinalis (including ff. *dentatifolia* and *latifolia*).—Cornwall, Devonshire, Somersetshire, Dorsetshire, Isle of Wight, Hampshire, Sussex, Surrey, Hertfordshire, Middlesex, Berkshire, Oxfordshire, Buckinghamshire, Suffolk, Cambridgeshire, Monmouthshire, Huntingdonshire, Northamptonshire, Herefordshire, Warwickshire, Radnorshire, Cardiganshire, Derbyshire, Lancashire, Durham, Cumberland, Kirkcudbright, Kinross, Stirling, Perthshire, Inverness, Forfar, Caithness, Orkney.

V. sambucifolia Mikan.—Sussex, Surrey, Essex, Middlesex, Oxfordshire, Monmouthshire, Gloucestershire, Herefordshire, Derbyshire, Cheshire, Yorkshire, E. Lothian, Perthshire.

ALTERATIONS IN VEGETATIVE GROWTH DUE TO ENVIRONMENTAL ADAPTATION IN BRAUNTON BURROWS.

F. R. ELLISTON WRIGHT.

Although the following remarks are based on observations in Braunton Burrows, they would probably apply in a general way to the vegetation of most sand dunes in the West of England. Here in Braunton Burrows, the sand is all wind blown from sea, partly shell and partly rock. The Calcium content in the much older fixed dunes shows little or no difference from that in the newer movable dunes, and is 2.86% estimated as carbonate.

The rainfall is very low for Devon, averaging about twenty-six inches per annum, more at the northern and less at the southern end of the Burrows.

The slacks or level areas between the sandhills are in some parts subject to flooding in the winter for many weeks; and the leaves at first produced by plants after this submersion are often altered to allow more ready transpiration. Thus the first leaves produced by *Taraxacum laevigatum* in such situations are quite entire, while the same plants later, when subjected to dryness, produce highly denticulate leaves.

Reduction of leaf surface is noticeable in all the drier parts; a striking instance of the opposite adaptation, though perhaps a very common one, for increasing transpiration by increasing leaf surface, was given by the cutting down, to about half, of one side of a double Hawthorn hedge bordering a ditch on the outskirts of the Burrows. On all the new growth of the cut hedge possessing its original root supply, store materials, and abundant moisture nearby, leaves were produced, the stipules of which alone had as large an area as the whole leaves of the uncut hedge. The figures show the impressions of actual average leaves on photographic printing paper from the cut and uncut sides of the hedge. (Fig. 1.)

It is usually stated that communities growing in loose or soft sandy soil apart from geophytes, are marked by having widely spreading runners, or underground stems as suckers. A census of the perennial plants here shows 95% with underground stems, underground storage roots, or surface runners. Such adaptations are said to be essential for anchoring plants, which would otherwise be unable to maintain themselves in sandy soil liable to movement.

This is probably true for *Ammophila arenaria* and *Carex arenaria*, which grow in the pure sand of the movable dunes. Of these two plants, which are so well known, I have little to say, except that a very noticeable character of *Ammophila*, not usually remarked, is that it thrives far better in more recently blown sand than in older ground, where it has been established longer, and where there is more humus; here it seldom flowers, and is more starved looking in every way. (Fig. 2, Fig. 3.)

Fig. 4 shows the great length of the underground stems of *Carex arenaria* invading new territory. Those who have not had the opportunity of seeing the plant in nature would hardly realise the great extent of the stems running underground, usually in straight lines.

The vegetation of shifting sandhills shows, in the West of England, a strong general likeness, with little variation; but the vegetation of the fixed sandhills and slacks shows much variation.

Apart from the two true sand-binders already mentioned, the great remainder of plants with underground stems, runners, etc., all grow normally on fixed hills and slacks, where there is no movement of sand, and the plants need no special adaptation for anchoring them in their positions; and although loose texture of soil is said to promote the production of subterranean shoots, unless some other reason of benefit arises from such form of growth, it would not occur—rather, we may say that plants requring such conditions are more likely to be found there than elsewhere.

The real reason for this vegetative propagation is that of the parable of the " seed which fell on stony ground."

The mortality of seedlings during desiccating winds is enormous. In some years annuals, such as *Erophila verna* and *Saxifraga tridactylites*, appear to be killed before they have fruited, and are saved from extinction by dormancy of seed. Experimentally, I have found that all the seeds of these and similar plants never germinate in the first year.

The success of propagation in this environment by runners, depending on the mooring of a limited number of daughter plants around the parent, is far more certain than the scattering of great quantities of seeds, none of which may gain a foothold.

If an isolated seeding plant of *Hyoscyamus niger* is carefully marked in the autumn, how many young plants will be seen near its position the following summer? Perhaps one, or none; yet the plant has scattered about ten thousand seeds within a radius of twenty feet.

A small plant of *Potentilla Anserina* will be seen in autumn with fifteen or more young plants well rooted around their parent on runners.

Bearing partly on this matter is the well-known fact that when from any reason—inhospitable situation, excessive shade, or climatic conditions—risk of extinction occurs by failure of seed production, or germination, then the production of offshoots, tubers, etc., takes place; and in the North, where many plants fail to flower, we have viviparous growths, bulbils, and offshoots so commonly.

The majority of plants in the Burrows producing runners, etc., are plants which grow commonly elsewhere; but here the production of these vegetative parts is altogether abnormal. After the first autumn rains, in some places the ground may be found covered with a perfect network of runners. (Fig. 5.)

Quite small plants of *Potentilla reptans* and *P. Anserina* are met with surrounded by radiating runners of far greater extent and number than in other more normal situations (Fig. 6-7.)

The form of *P. Anserina* here depicted is known by plant collectors as var. *sericea* (Hayne), with a felting of silvery hair on upper surface of leaves. It is a xerophytic form, but I mention its name, as it is known that very closely-related biophytes may behave differently under certain influences.

Viola Curtisii, perhaps the commonest violet in the Burrows, has numerous underground stems. *Viola hirta*, also very plentiful, though very rarely producing stolons, is a shy blossomer here, but freely produces cleistogamous flowers, and has the special adaptation of almost burying the large fruits in the ground. It is worthy of notice, in view of what has to be said of prostrate plants forms later, that the stems of these large fruits come off from the lower part of the abbreviated stem below the leaves.

Galium verum, in the form known as var. *maritimum* (DC.), perfectly prostrate, with somewhat thickened leaves and reduced inflorescence, forms fibrous roots on the prostrate branches, and has extensive underground shoots; it has been stated that these are due to branches becoming buried by moving sand. Fig. 8 will show that these are true underground shoots, coming off from low down in the ground, and have the typical extra thickness and scale leaves characteristic of subterranean stems. The plants photographed were removed from fixed dunes where there had been no movement of sand.

Bellis perennis will repay careful examination. It produces long underground stems and plentiful fibrous roots from the small surface leaf rosettes. (Fig. 9.)

Pulicaria dysenterica, *Teucrium Scordium*, and *T. Scorodonia* produce extensive underground stems, as does *Epipactis palustris*, which is the common Orchid of the Burrows.

Glaux maritima produces very extensive underground stems and runners, which, seen in Fig. 10., are very different from the habit of this plant in other situations.

Salix repens is the only Sallow which is really at home in the Burrows. Its prostrate branches root—underground shoots are rare. The branches are thrown out equally in all directions, forming rounded clumps of all sizes, which are very typical in appearance, until they coalesce with other clumps. (Fig. 11.)

Mentha aquatica is present in all the slacks in the densely hairy form, called by plant collectors var. *denticulata* (Braun). It has been suggested that the reduced size of the leaves with consequent approximations of crowding of hairs, is the cause of apparent increase of hairiness; but it may be noted that these plants of *M. aquatica*, when the flood water recedes from their habitat in the spring, at first produce glabrous leaves; again, after the first autumn rains, a profusion of suckers is produced (Fig. 12), out of all proportion to the size of the very small plants, and the leaves on these runners are very small and glabrous.

Scutellaria galericulata produces many long underground stems. The plant grows, not as might be expected in the damp places, but on the sides of dry fixed dunes, and always on the side distant from the sea. It is not usually at all stunted, and its presence here has always surprised me.

In all the slacks and flat areas, *Agrostis alba* is the most prevalent grass, in all forms, from var. *maritima* (Meyer) to var. *stolonifera* (L.), where there is more humus and moisture. The minute prostrate form on the dry flat ground, roots freely from the prostrate short leaved branches, bearing tufted lateral shoots, and produces very little blossom. (Fig. 13.) The bases of the stems are usually clothed with the remains of old withered leaves similar to those found on *Koeleria*.

In flat areas of newly-blown sand, *A. alba* is no mean sand-binder, and is often the first plant met with on approaching a vegetative area from raw sand. It is then seen usually in the form of little round humps of densely caespitose stems, rarely flowering, having a zonal arrangement on the outskirts of the other vegetation. (Fig. 14.)

Tinckler (1925 *Anns. Bot.*) has shown with *Dactylis glomerata* and other grasses, that by restricting the hours of daylight, densely tufted vegetative growth is produced, with suppression of flowers. Considering the open conditions of growth of *Agrostis alba* in the Burrows, the opposite condition might be expected. But we cannot dismiss the theory that photoperiodism may be acting here, for under highly xerophytic conditions, during many hours of the day transpiration may be stopped by closed stomata, etc., and at the same time, photosynthesis being stayed, the plant may be really working under " short day " conditions.

During summer, in the dry slacks and flat areas, vegetation rarely rises from the surface of the ground, being composed chiefly of a flora with prostrate stems, or closely formed rosettes, with no overlapping of plants, so that we have here almost an exclusively two dimensional arrangement of flora, where there is no competition for light, as no plant overshadows another. The competitive factor is small, and many open societies are found.

The main struggle is against insufficient water, a uniform dryness, and, in some of the deeper slacks, great periodic dryness, ever increasing by desiccating winds, with the nutritional factor extreme in many places.

Rabbits must never be forgotten; they swarm everywhere, effecting mutilation, and are one of the possible causes of *Ononis repens* appearing often in a spinous form.

Some plants which grow normally with an ascending erect stem are found here with no appreciable stem above ground, profusely branched, with all branches prostrate on the ground, in a radiate form. These plants show no mutilation of the central crown or growing point, instancing adjustment of the vegetative plant body to environmental conditions, whereby chamaephytes become hemi-cryptophytes.

Fig. 15 shows this remarkable adaptation of *Crepis capillaris*. The plants are sometimes densely tufted; the flowering stems lie quite prostrate, with only the flower head turned upwards to the sun and visiting insects.

Fig. 16 shows the same adaptation in *Juncus articulatus.* This form has two to four leaves on a stem; these leaves being nearly cylindrical, the perianth segments are nearly equal, and usually all acute. The capsules, when ripe, are shining black, rather more trigonous than triquetrous (variable), more distinctly beaked than normal *J. articulatus*, clusters of fewer flowers than type, all parts absolutely prostrate.

Dr. E. Drabble and Mr J. E. Little have both examined this plant for me, and agree in placing it under *J. articulatus*, var. *nigritellus* (Don) of Dr. Druce's list. Mr A. J. Wilmott also kindly examined plants, and considers that they match the Berrow Burnham Sandhills' plant called *nigritellus*, but do not match the figure of the plant originally described by Don as *nigritellus*, and he prefers to call them a dune form of *J. articulatus.*

Leontodon nudicaulis (*hirtus*) presents a similar appearance to *Crepis capillaris* (Fig. 17.), both in leaves and flowering parts; frequently in the form, with the involucre quite hairy, known as var. *lasiolena* (Druce), easily mistaken for *L. hispidus,* unless the fruits are examined.

Juncus bufonius assumes a dwarf, densely tufted form, with radiating short prostrate stems, and is the var. *ranarius* (Nees). (Fig. 18.) In some places plants are found exhibiting extreme nanism, with foliage like a small moss, having but one cleistogamous flower or fruit. The form known as var. *fasciculatus* (Koch) has often been reported as growing in the Burrows. It does occur in the parish, but, in my experience, does not grow in the Burrows.

Equisetum palustre is found in absolutely dry places, with completely prostrate branches, often having a curious arcuate form giving a spirulate appearance to the plant. (Fig. 19.) It was a less extreme form that Dr. Druce reported from here in 1931 as mimicking *E. variegatum* under the name of var. nov. *simulans* (Druce).

Littorella uniflora is very plentiful and little noticed, bearing in foliage such a strong resemblance to *Plantago Coronopus* var. *pygmaea* (Lange), which, with its almost entire leaves, swarms everywhere.

The leaves of *Littorella* are not semi-cylindrical and fleshy as when growing on the margin of water, but leathery, flat or strap-like, radiate in arrangement, very closely adpressed to surface of soil. (Fig. 20.)

Both male and female flowers are freely produced, and though these plants are in summer growing on very dry ground, they produce underground stems which give rise to new plants, almost as freely as those growing in water. If these plants are carefully removed from the ground and the leaves separated, it will be found that the actual stem is half-an-inch or more below the soil surface—an excellent means of limiting loss of water.

Mentha aquatica assumes a completely prostrate growth, with the same adpression of leaves to the ground, showing a rather beautiful leaf mosaic (Fig. 21), the short, usually single stem ending in one round capitate inflorescence. The leaves, as before stated, are densely hairy; these hairs, like those on most other hairy plant forms here, as *Marrubium vulgare* var. *apulum*, are white, for obvious protection against heat.

To what extent the employment of hairs on the surface of plant tissue can be used for the absorption of water from the atmosphere is very doubtful; they certainly cause condensation of water, as dew, on themselves to a greater extent than occurs on glabrous tissues. These white hairs usually contain air, making them better non-conductors, and in their more usual position on the under-surface of leaves protect stomata from heat, and, when necessary, protect them from wet.

Solanum Dulcamara usually grows as a well-branched upright bush, but where exposed to the full force of violent winds, may be completely prostrate. (Fig. 22.) This form does not quite possess the characters of var. *marinum* (Bab.), as the leaves are not all cordate.

The same may be said of *Rubus fruticosus;* only in positions of great exposure to wind is it prostrate. (Fig. 23.)

Anagallis tenella, in summer, grows on very dry ground; absolutely prostrate, with pretty leaf mosaic. (Fig. 24.)

Anagallis arvensis thrives even close to the sea, and in practically pure sand; it behaves here almost as a facultative halophyte. Salts, especially chlorides, when increased allow plants to endure greater heat, so that the temperature at which the plant is killed by dry heat is raised. The thickened stems and leaves can be seen in Fig. 25. It roots freely from the prostrate branches, and frequently produces buds from the hypocotyl.

Geranium molle produces typical rosettes, behaving often as a biennial, and, after the vegetative period, maintains the rosette form during the flowering period. (Fig. 26.)

It is very interesting to notice that the flowering stems of these plants, and other radiate forms, as of *Crepis capillaris* and *Leontodon nudicaulis*, come not from the crown of the plant, but from some way down the abbreviated stem, and, as before stated, the growing point or crown shows no sign of mutilation.

The repeated effect of desiccating wind on the growing point, though producing no outward sign, probably does act as an injury. Everybody knows that injury of a growing stem will cause bud-production below the injured spot; and where normally only one bud is present at a leaf axil, injury of this bud will often cause two or more buds to appear at or below its position, and this, I think, has a good deal to do with the denseness of branches in many prostrate forms.

The part played by the wind factor may be partly judged by the photograph of a wind-pruned Hawthorn hedge on the landward side of the Burrows. (Fig. 27.) The bushes appear bent over; but this is only apparent. The real cause is the repeated killing by desiccation of all the opening buds on the windward side, with continued growth on the lee side.

Erodium cicutarium and *E. maritimum* produce beautiful frondose rosettes, with leaves closely adpressed to the ground. These leaves are arranged by petiolar lengthening, so as to have the least possible overlapping, and present practically a complete disc of leaf surface to the light (Fig. 28, Fig. 29), and maintain their stems in a prostrate position in the fruiting stage. (Fig. 30.) The stems are remarkably thick, and no doubt are capable of water storage.

These rosulate forms are very perfect xerophytic adaptations for limiting transpiration. Only one surface of the leaf is exposed to wind, and that with practically no stomata. These are, on the under-surface, fully protected, the soil below them naturally shaded, and kept from drying. The sand under the rosette of leaves will usually " ball " in the hand. The temperature under the rosette is actually lower than the surrounding shade temperature of the air.

The stem is entirely underground, and living in a situation where food supply is restricted. This, apart from providing against the stress of wind on an aerial stem, is an excellent economy of building material. It must also be remembered here, that every inch above the soil surface gives a definite increase in the velocity of the wind.

The upper surface of these leaves shows the usual adaptations of sun leaves, the surface generally more wrinkled, due to increase in number of vascular strands; thickening of cuticle, increased development of epidermis; but most noticeable is greater development of the palisade parenchyma in two well-marked layers. In the leaves of *Erodium maritimum*, the palisade layer equalled two-thirds of the whole leaf thickness. The leaves are actually thicker than those growing in moist situations; leaves of *Mentha aquatica* from the Marsh were found to be only half the thickness of those from the Burrows.

Stomata sunken deeply in the epidermis, or in grooves, are common, but in some highly xerophytic plants they lie quite on the surface, as in *Sedum acre*. And just as we know that some plants are quite incapable of closing their stomata at all, among others there is probably a difference in the efficiency of closure. These superficially placed stomata may be highly efficient in closure.

The stimulus concerned in the promotion of close adpression of the leaves to the soil surface appears to be definitely related to the regulation of transpiration. If the rosette be cut off or removed from the soil, and then left exposed, all the leaves bend down still further towards the root, to such an extent that the leaves meet again below the stem. If the cut off rosette is placed in water and shade, then the leaves will gradually rise upwards from what was the soil surface.

The alterations in position are mainly performed by the petioles, which, I think, are very important parts of these plants. It is by their exact lengthening, etc., that the leaves are always placed in the most advantageous position. Notice the suggestive thickening of petioles in Fig. 29. They are capable of water storage.

If a rosette of *Erodium maritimum* has its root divided a quarter-of-an-inch below the leaves, and again cut half-an-inch below the leaves, to make sure that disconnection from the root is complete, unless climatic conditions are very severe, the plant does not die, but water is

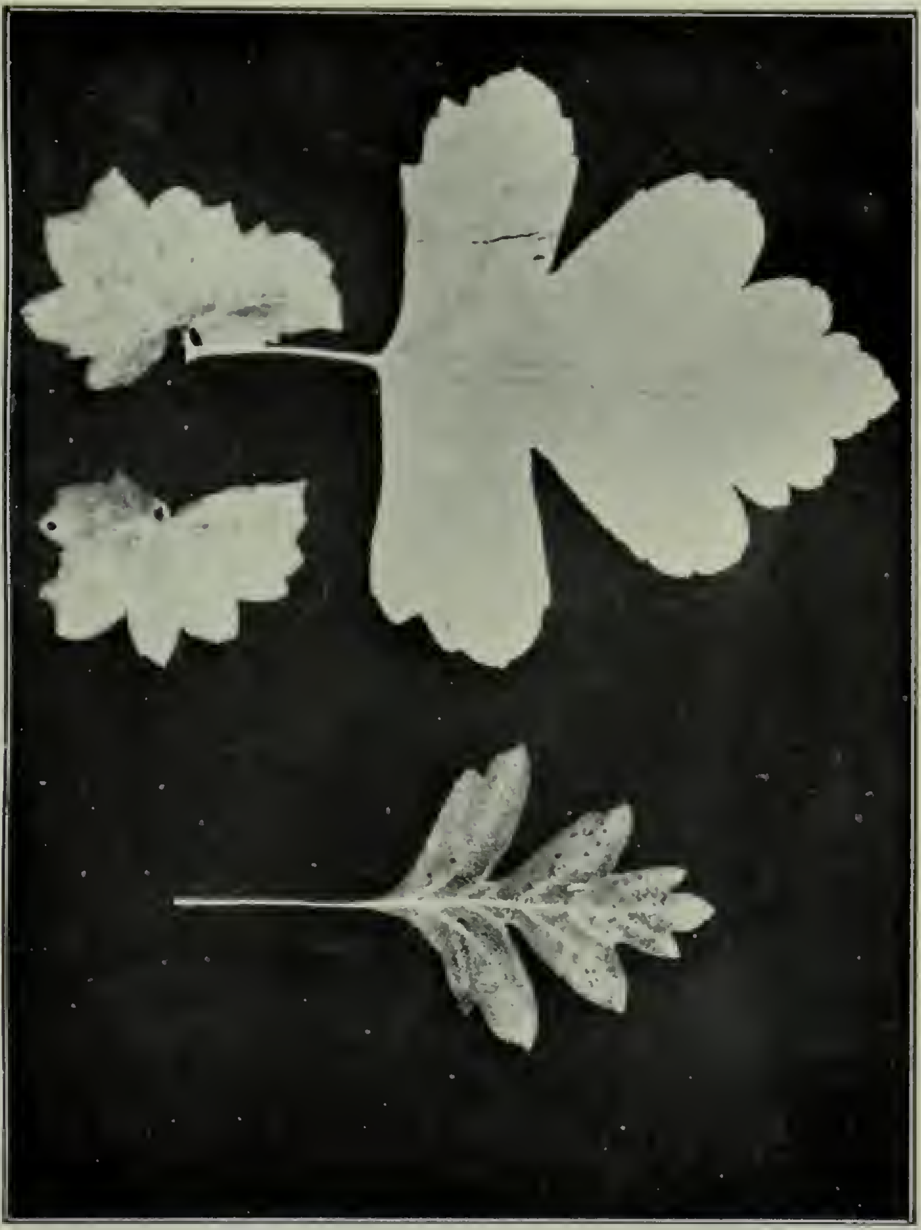

Fig. 1.
HAWTHORN LEAVES.
Above, from cut hedge; below, from uncut hedge.

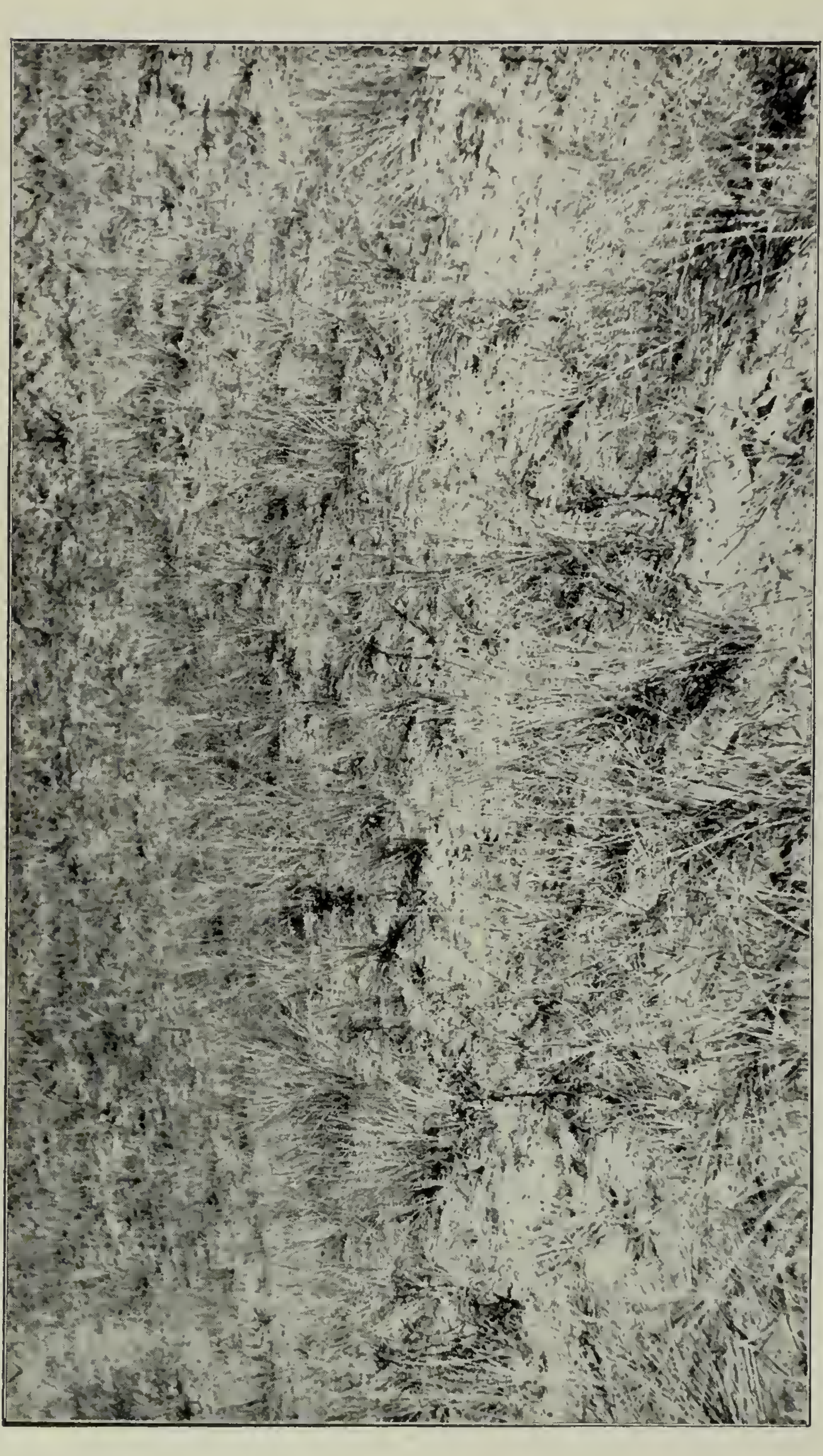

Fig. 2.
LONG ESTABLISHED MARRAM ON FIXED DUNES

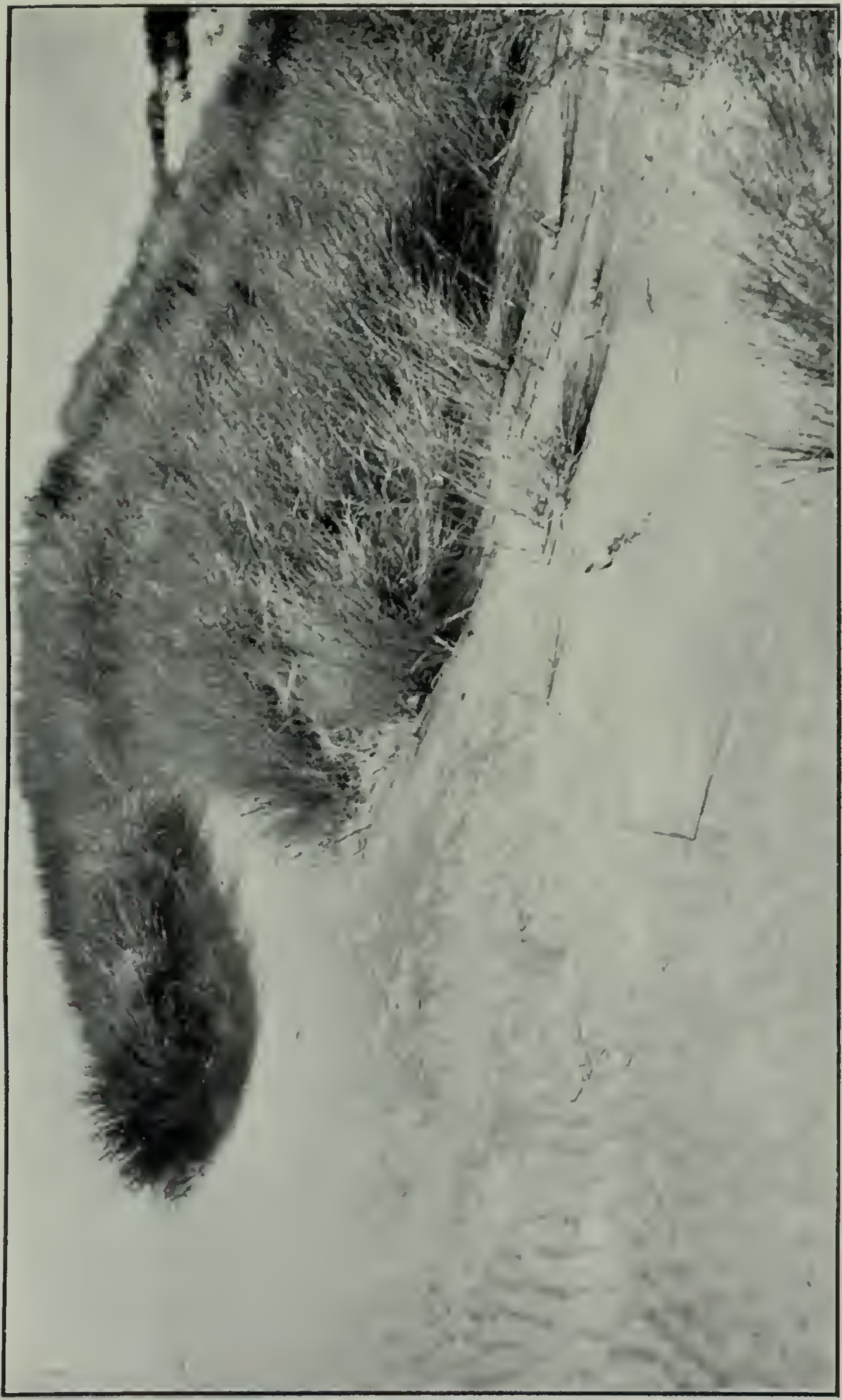

Fig. 3.

LUXURIANT MARRAM ON RECENTLY BLOWN SAND.

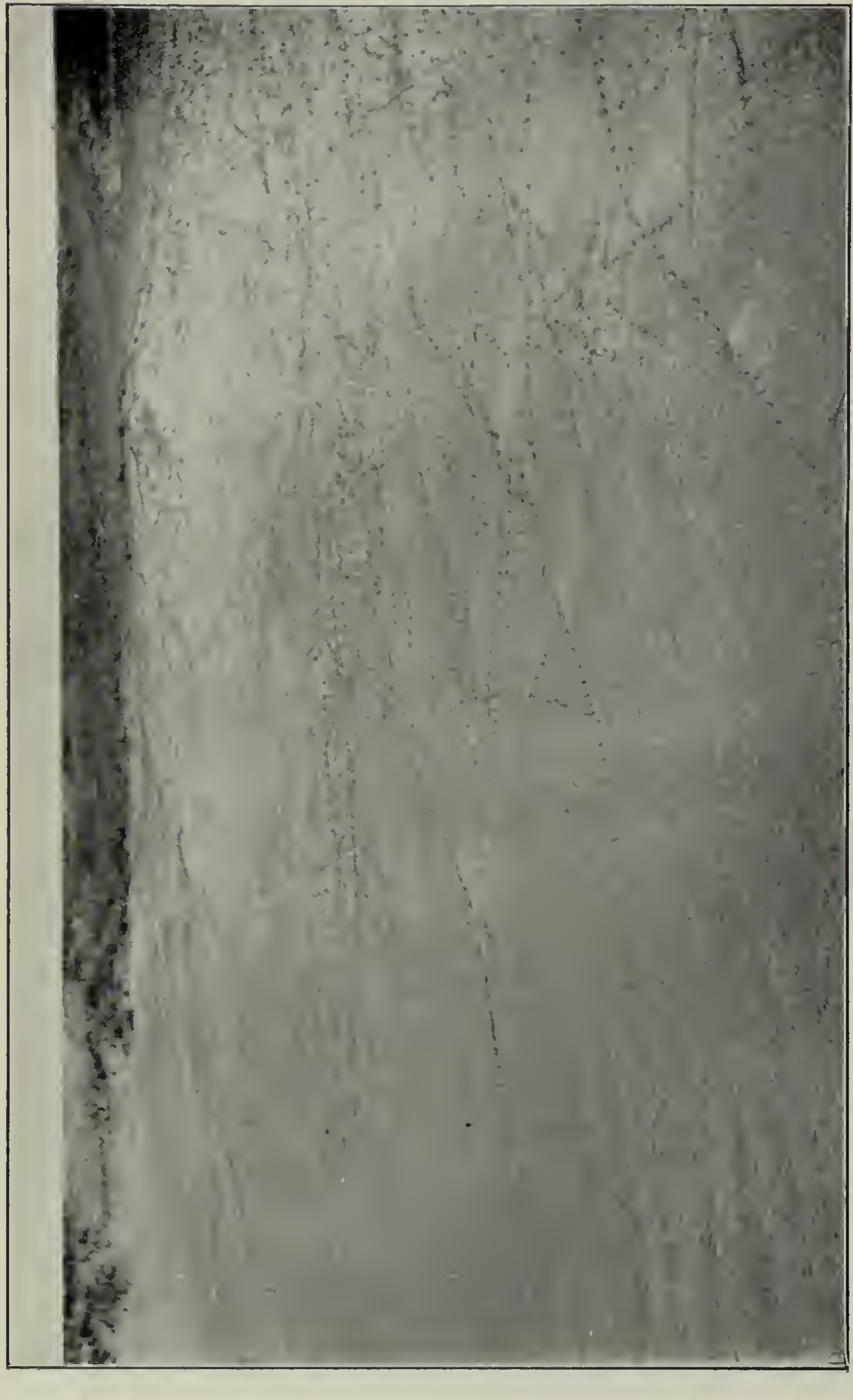

Fig. 4.
CAREX ARENARIA. Extending into new ground.

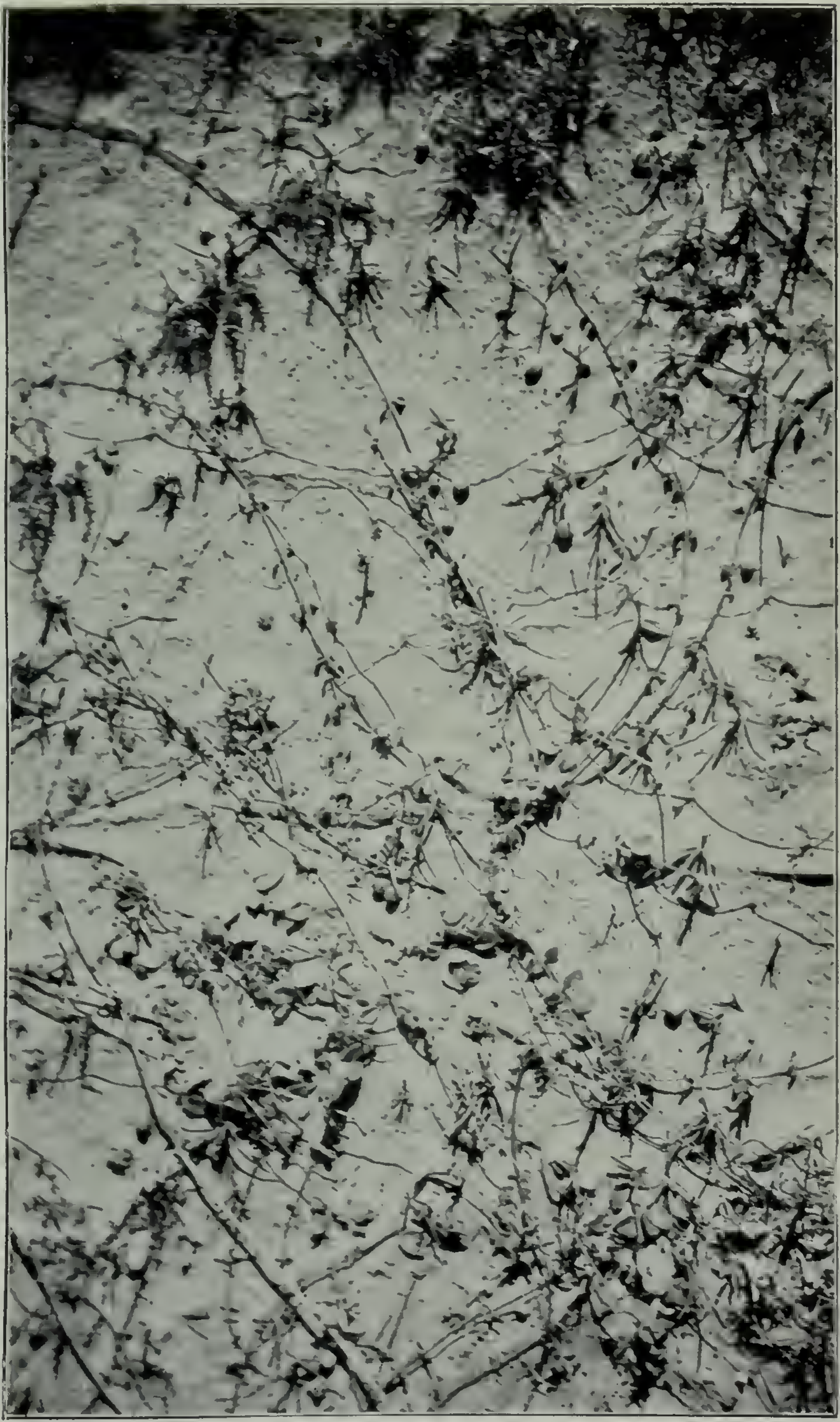

Fig. 5.
NET WORK OF RUNNERS. Some of the finer stems are hardly visible in photo.

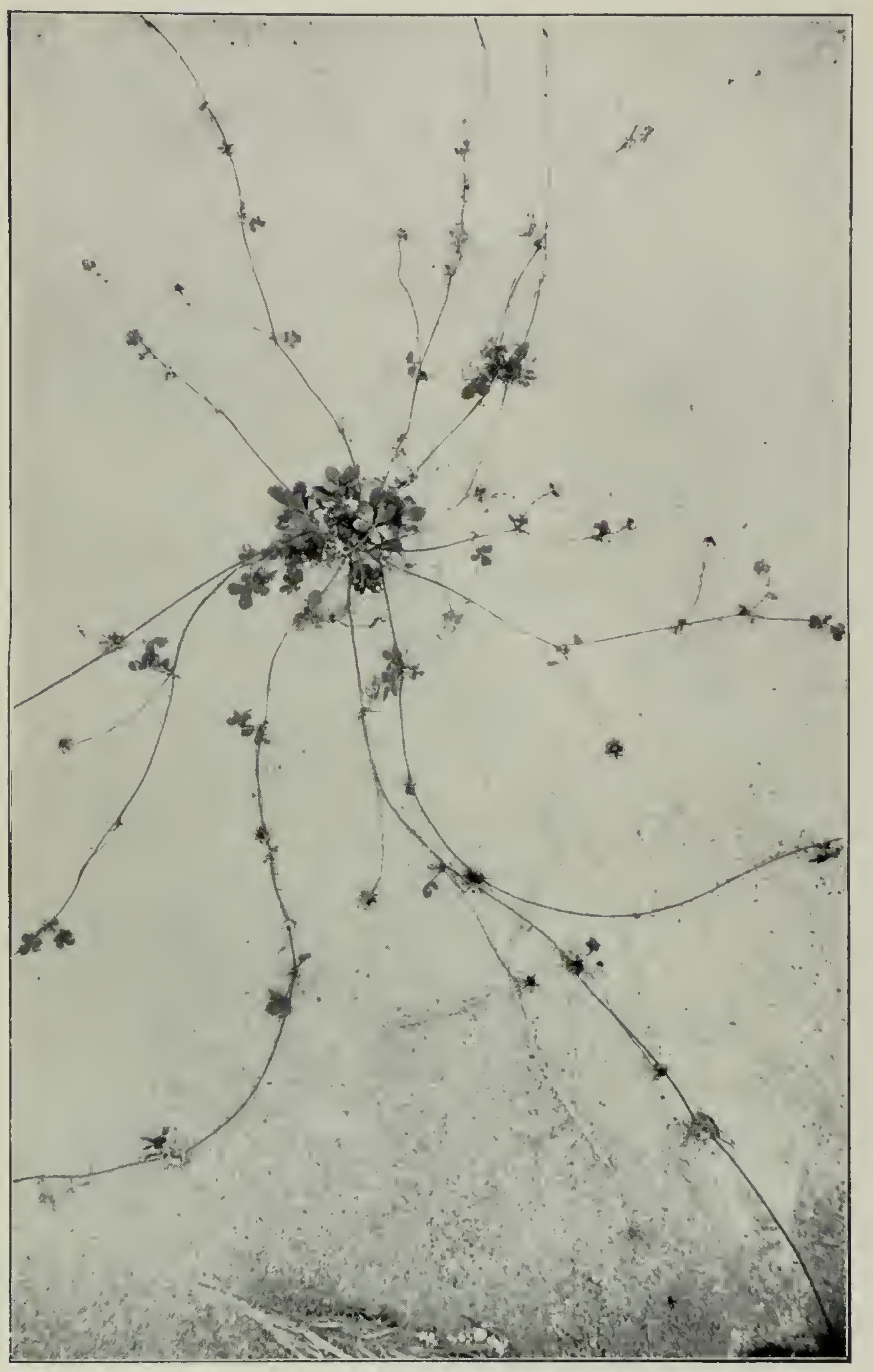

Fig. 6.

POTENTILLA REPTANS. Frequently more flowers are found on the runners than on the parent plant.

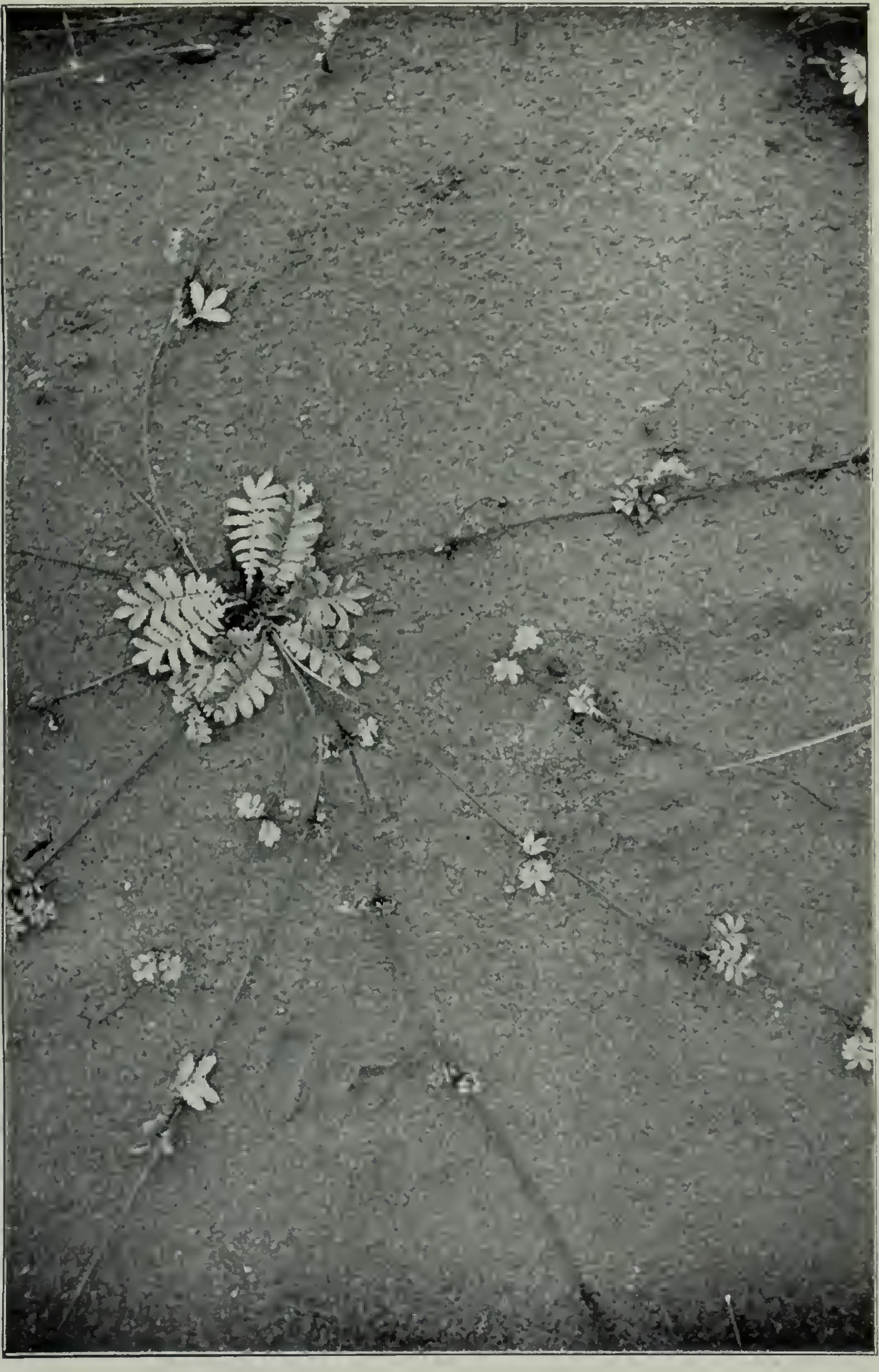

Fig. 7.
POTENTILLA ANSERINA, var. *SERICEA*. Only one-third of extent of runners shown.

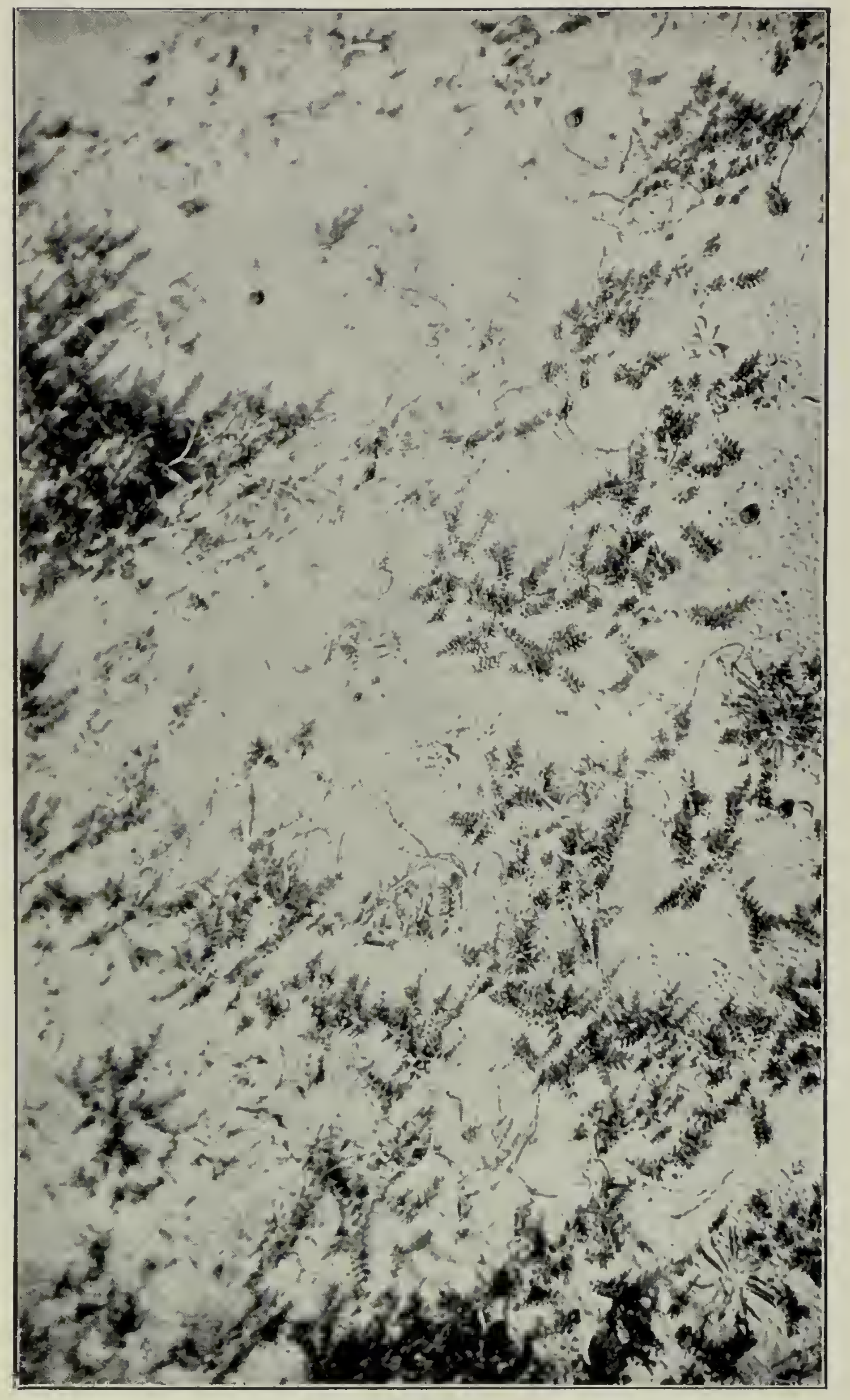

Fig. 10.
GLAUX MARITIMA, showing great development of (?) runners.

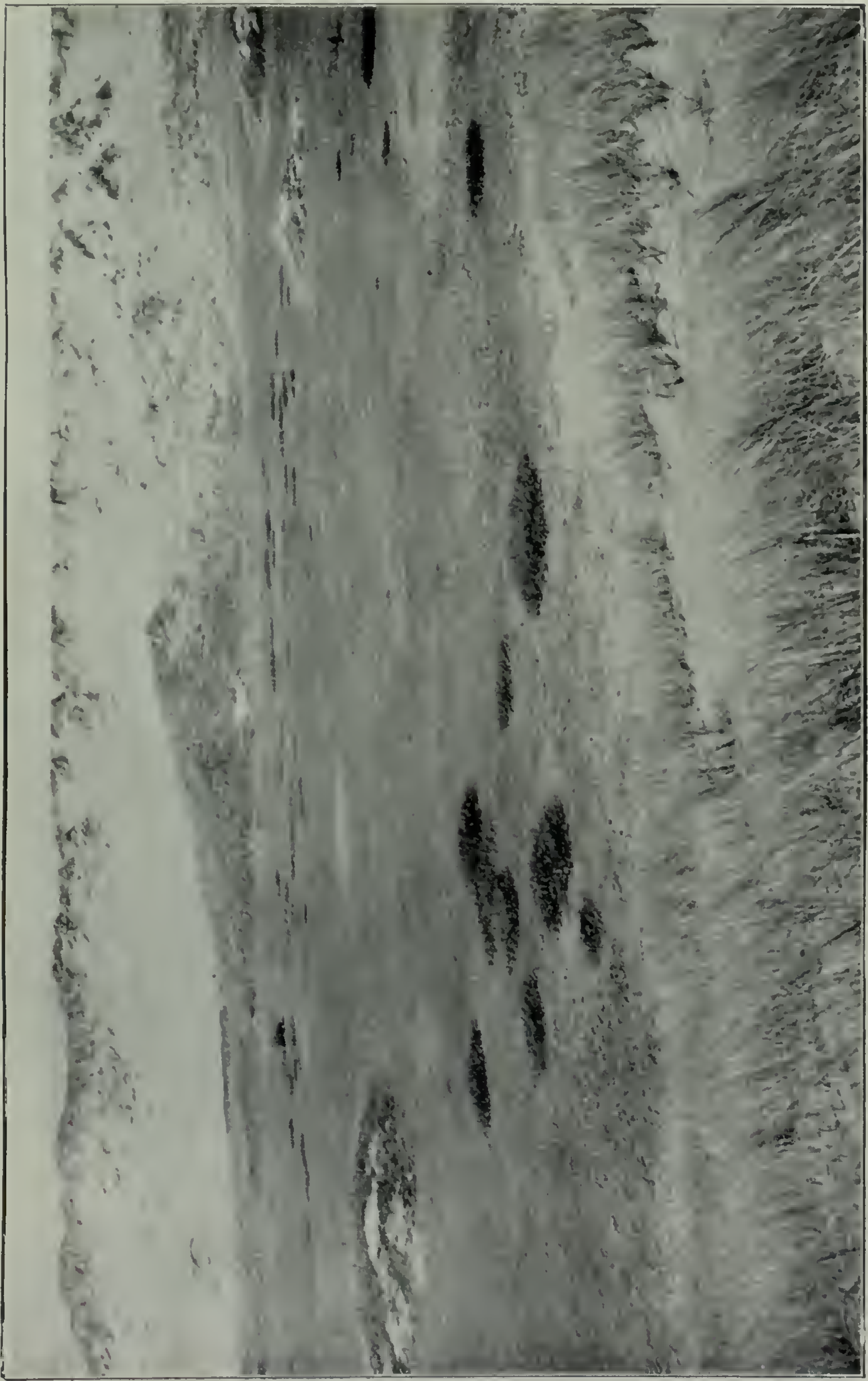

Fig. 11.
SALIX REPENS.

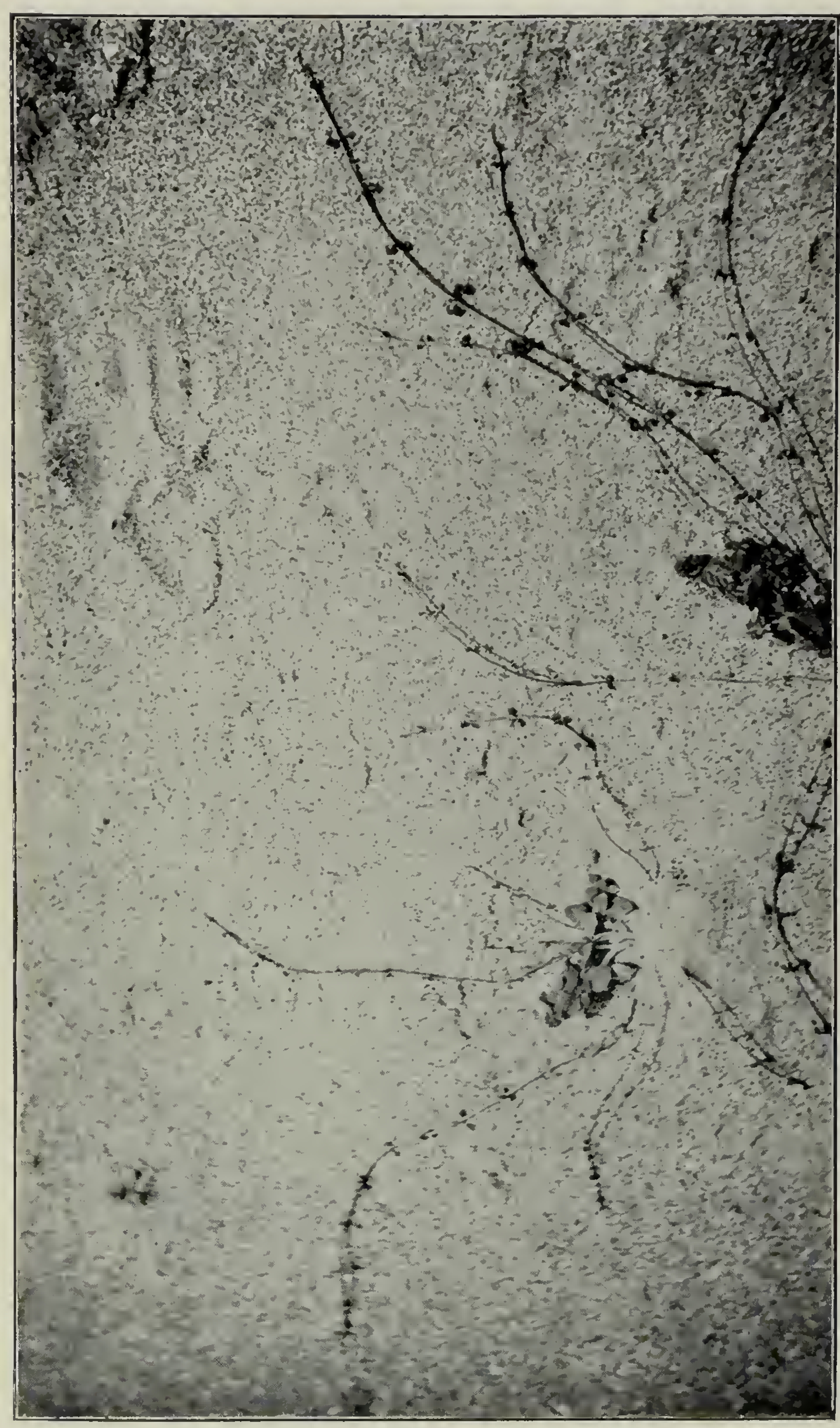

Fig. 12.
MENTHA AQUATICA, showing autumn runners.

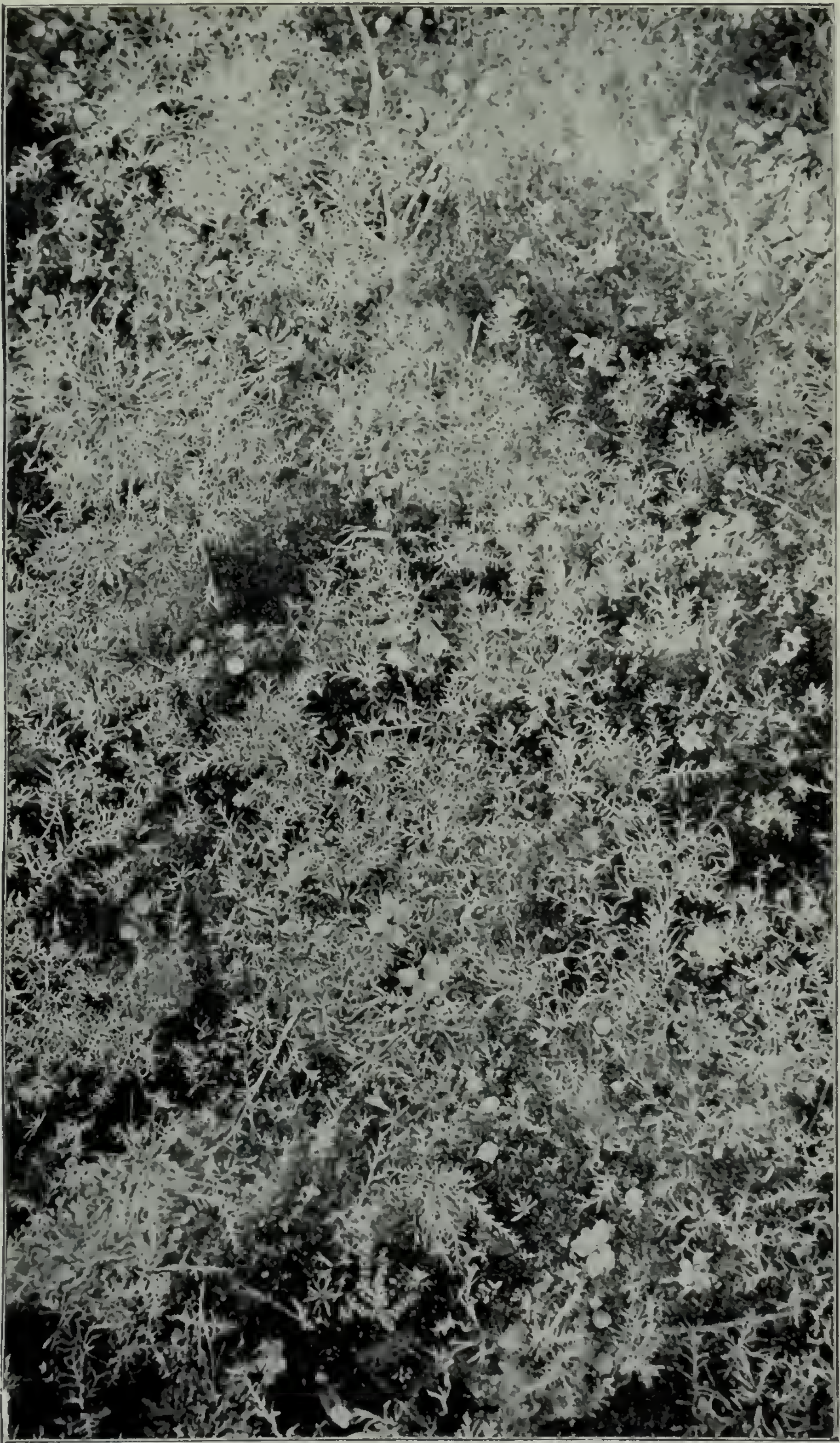

Fig. 13.
AGROSTIS ALBA, in prostrate form. The size of the plant parts may be estimated by comparison with the rabbit droppings.

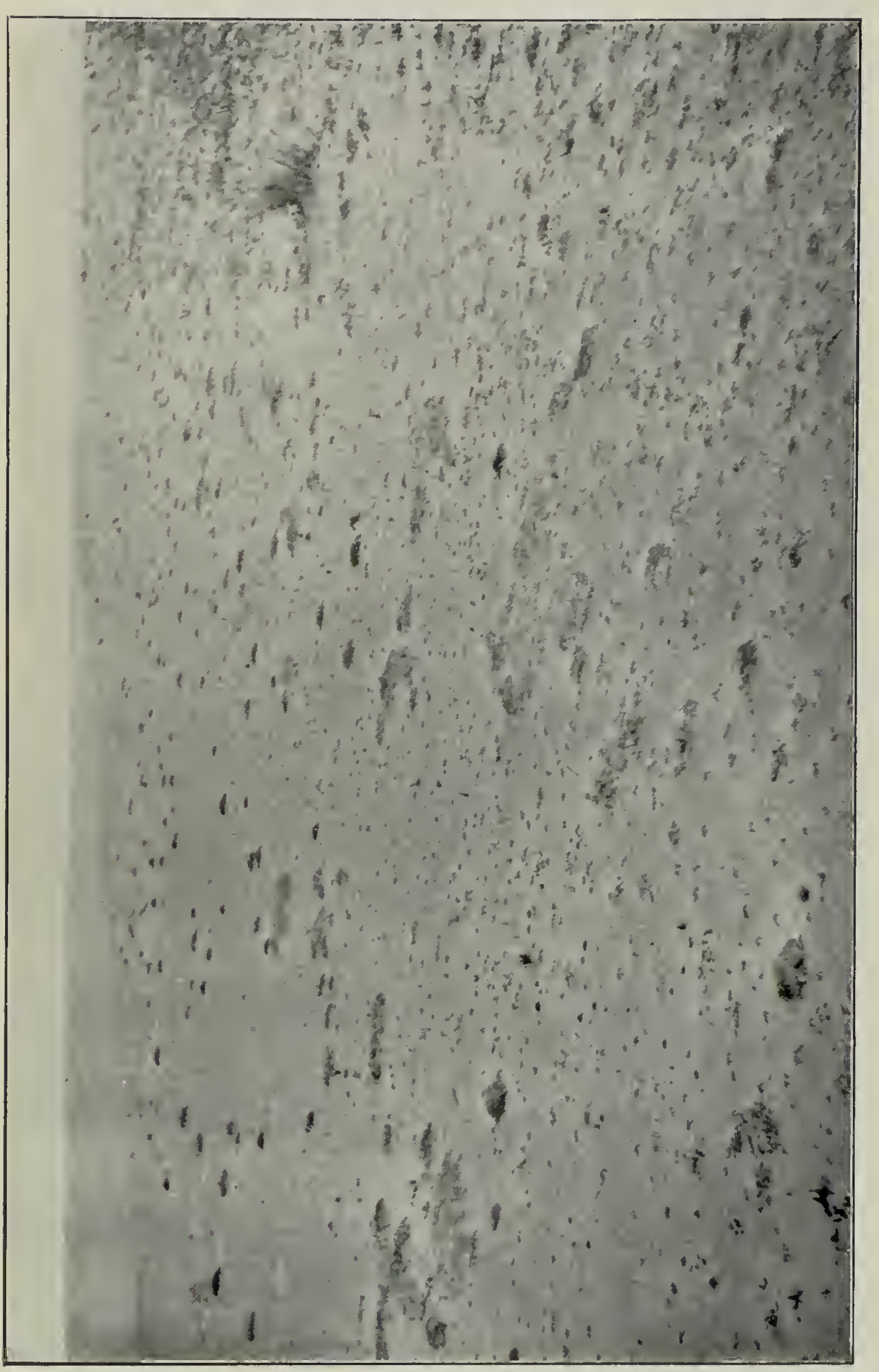

Fig. 14.
AGROSTIS ALBA. Pioneer cushions.

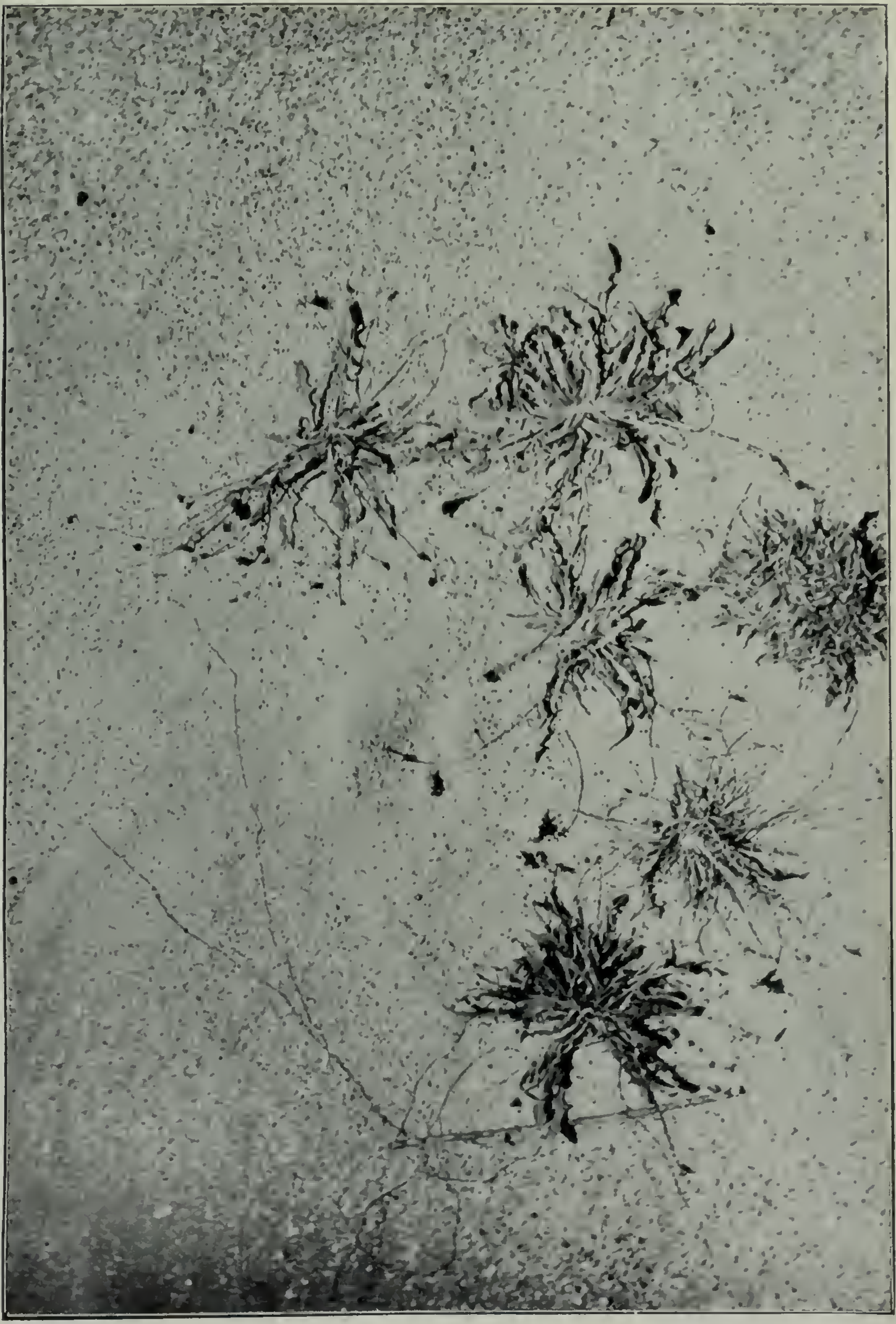

Fig. 15.
CREPIS CAPILLARIS. Prostrate rosulate form.

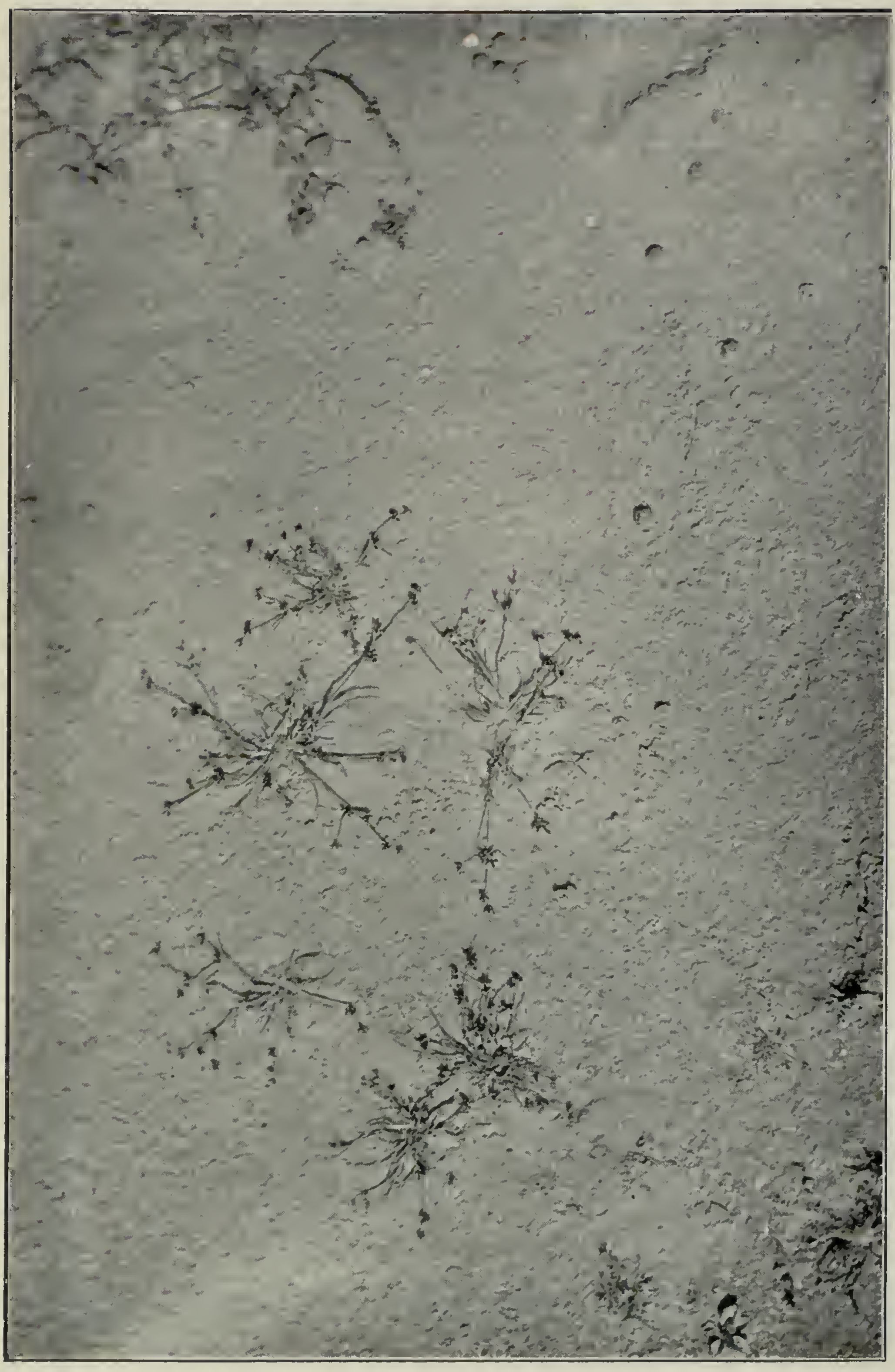

Fig. 16.
JUNCUS ARTICULATUS. Extreme prostrate form.

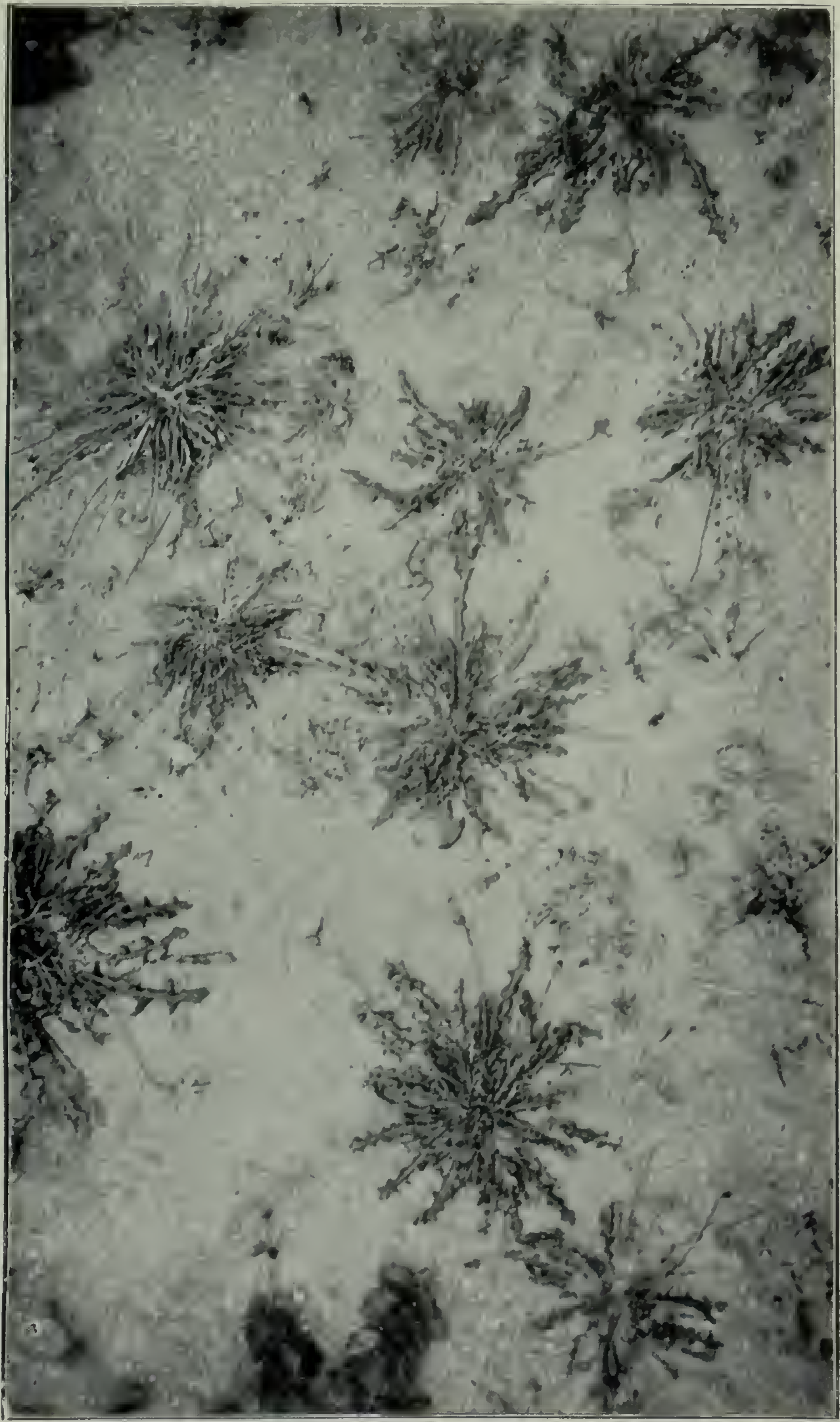

Fig. 17.

LEONTODON NUDICAULIS. Prostrate flowering stems coming off from main stem below leaves.

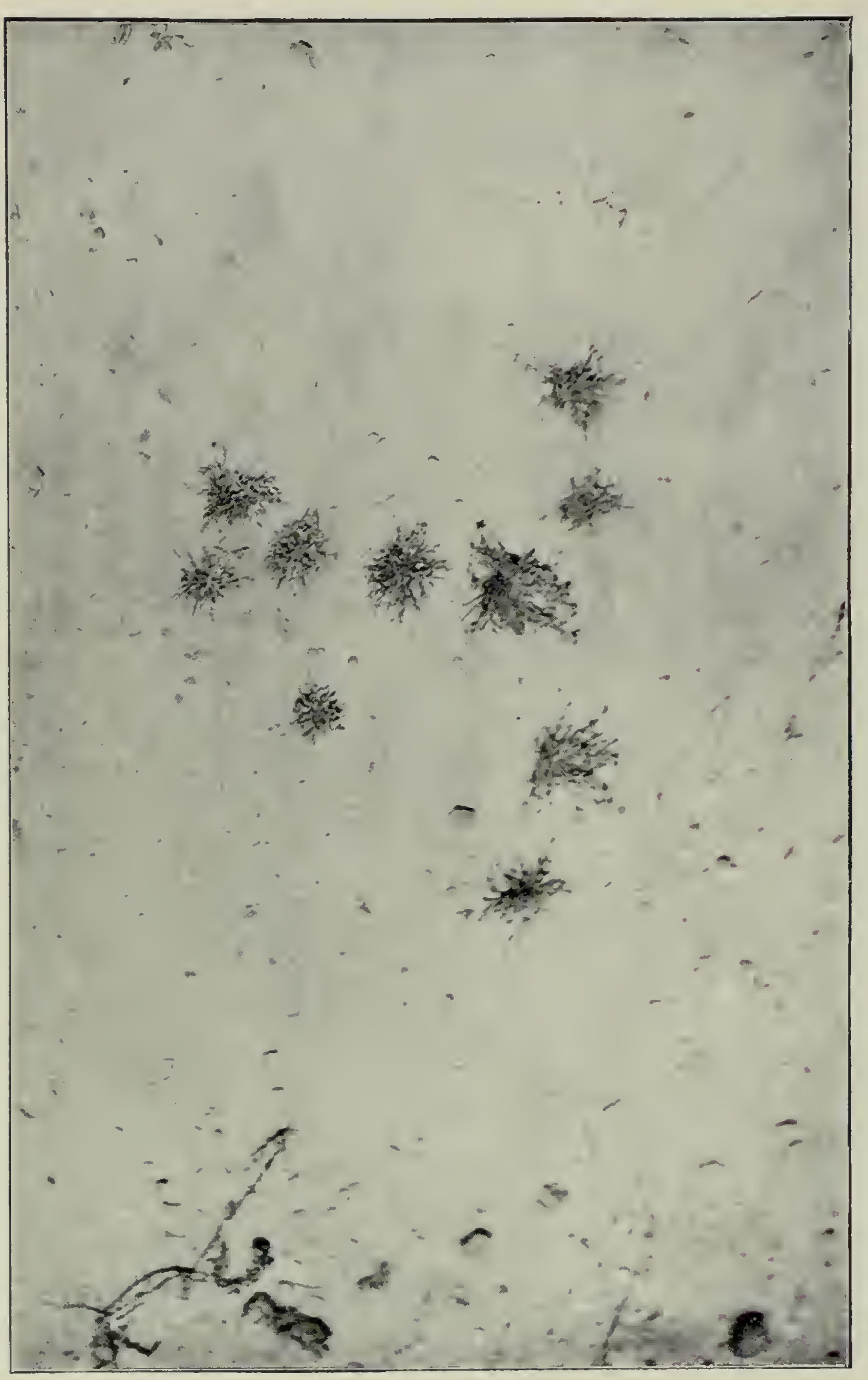

Fig. 18.

JUNCUS BUFONIUS, var. *RANARIUS*. Densely tufted, prostrate. Diameter of largest plant 3½ inches.

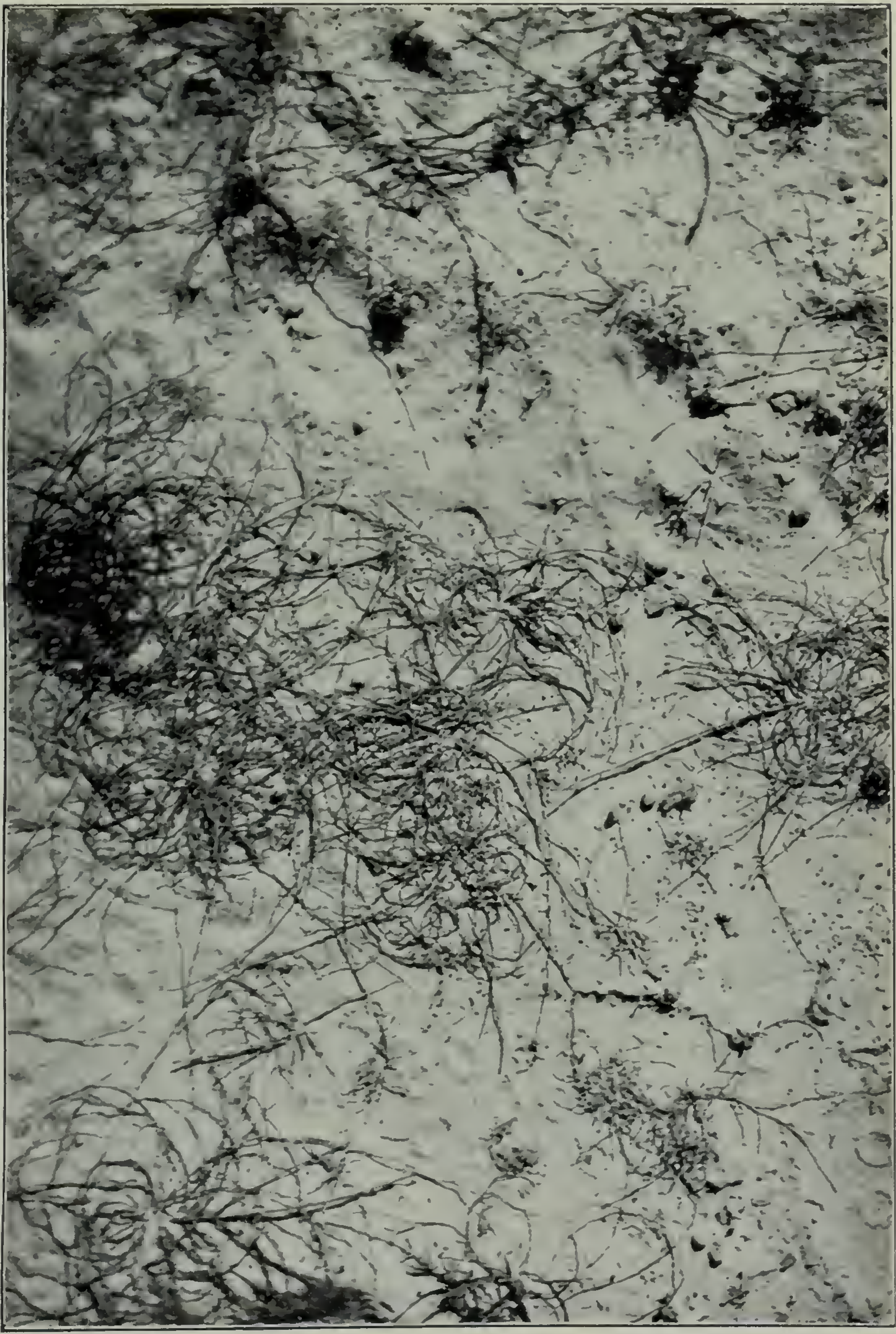

Fig. 19.
EQUISETUM PALUSTRE. Extreme prostrate form.

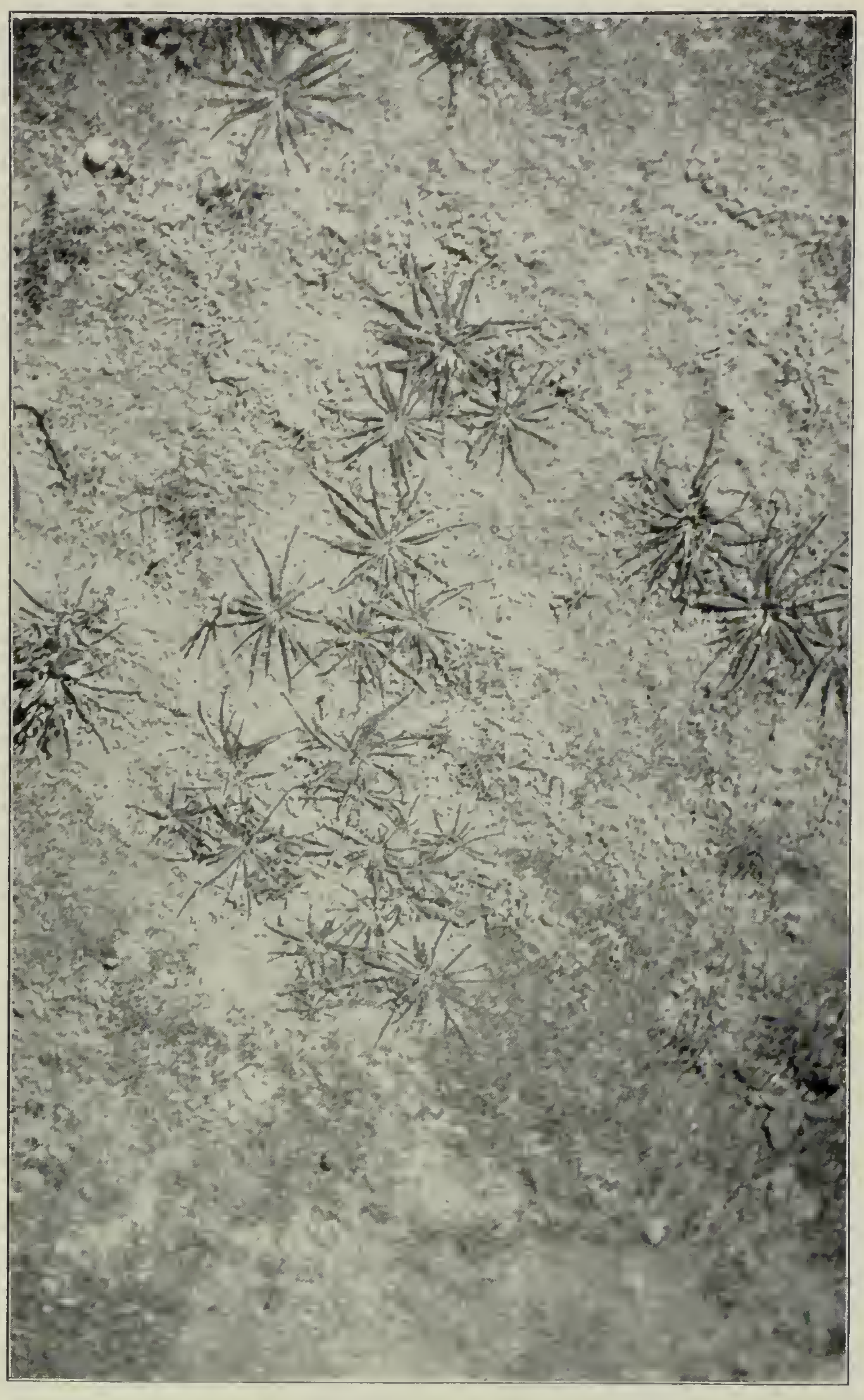

Fig. 20.
LITTORELLA UNIFLORA. Dry ground form.

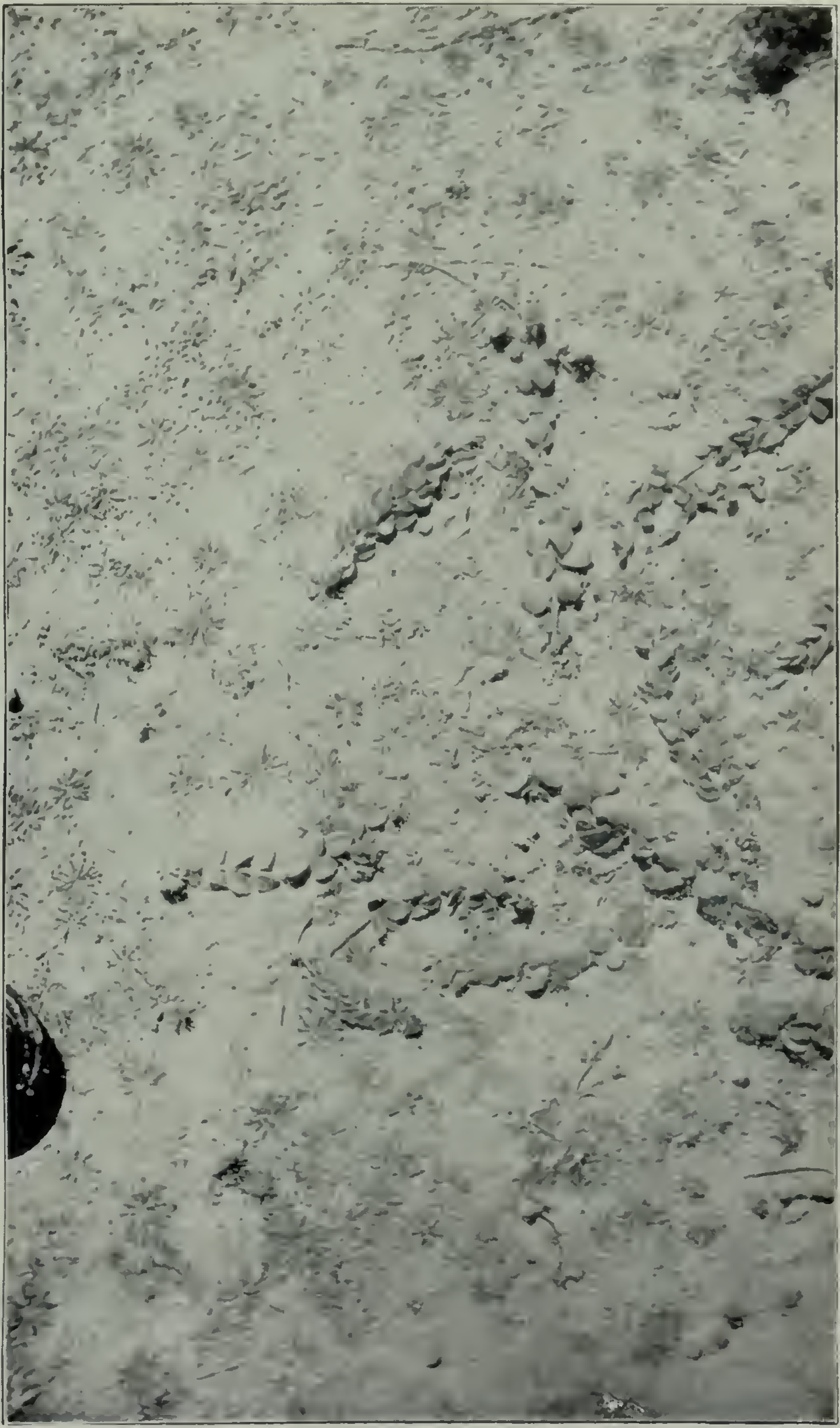

Fig. 21.
MENTHA AQUATICA, prostrate form, associated with *Plantago Coronopus*, var. *pygmaea* (Lange).

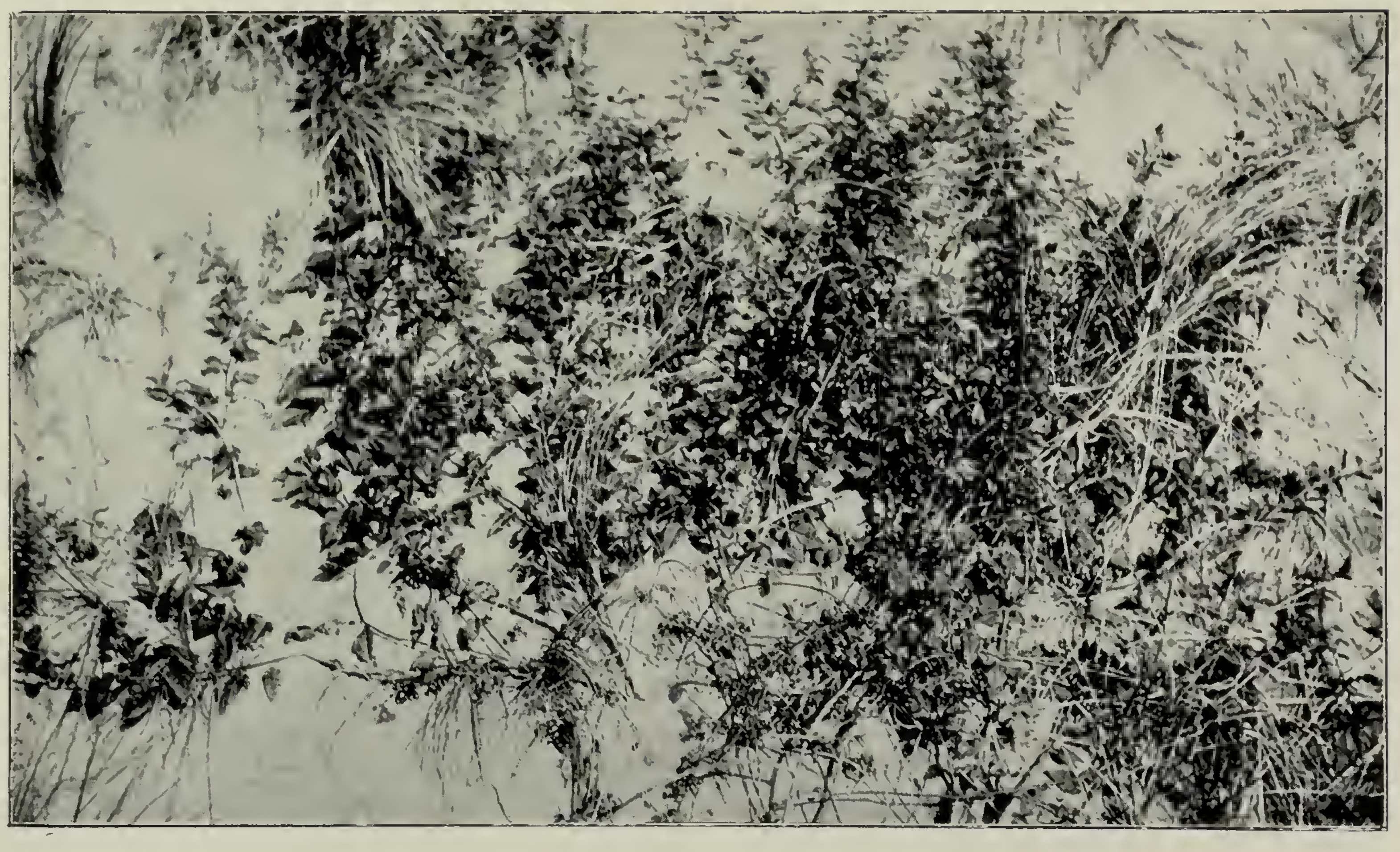

Fig. 22.
SOLANUM DULCAMARA. Wind exposed prostrate form.

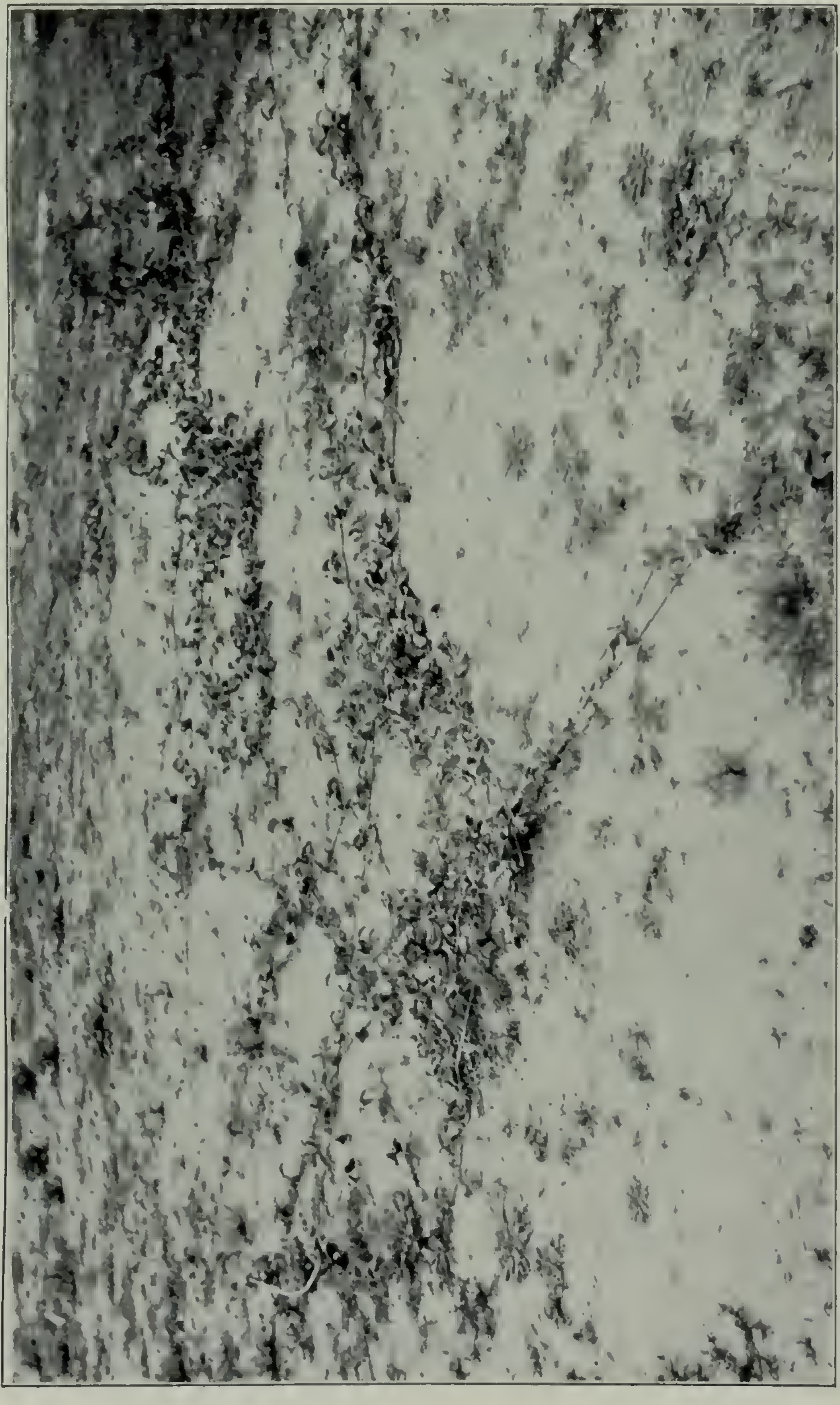

Fig. 23.
RUBUS FRUTICOSUS. Wind exposed prostrate form

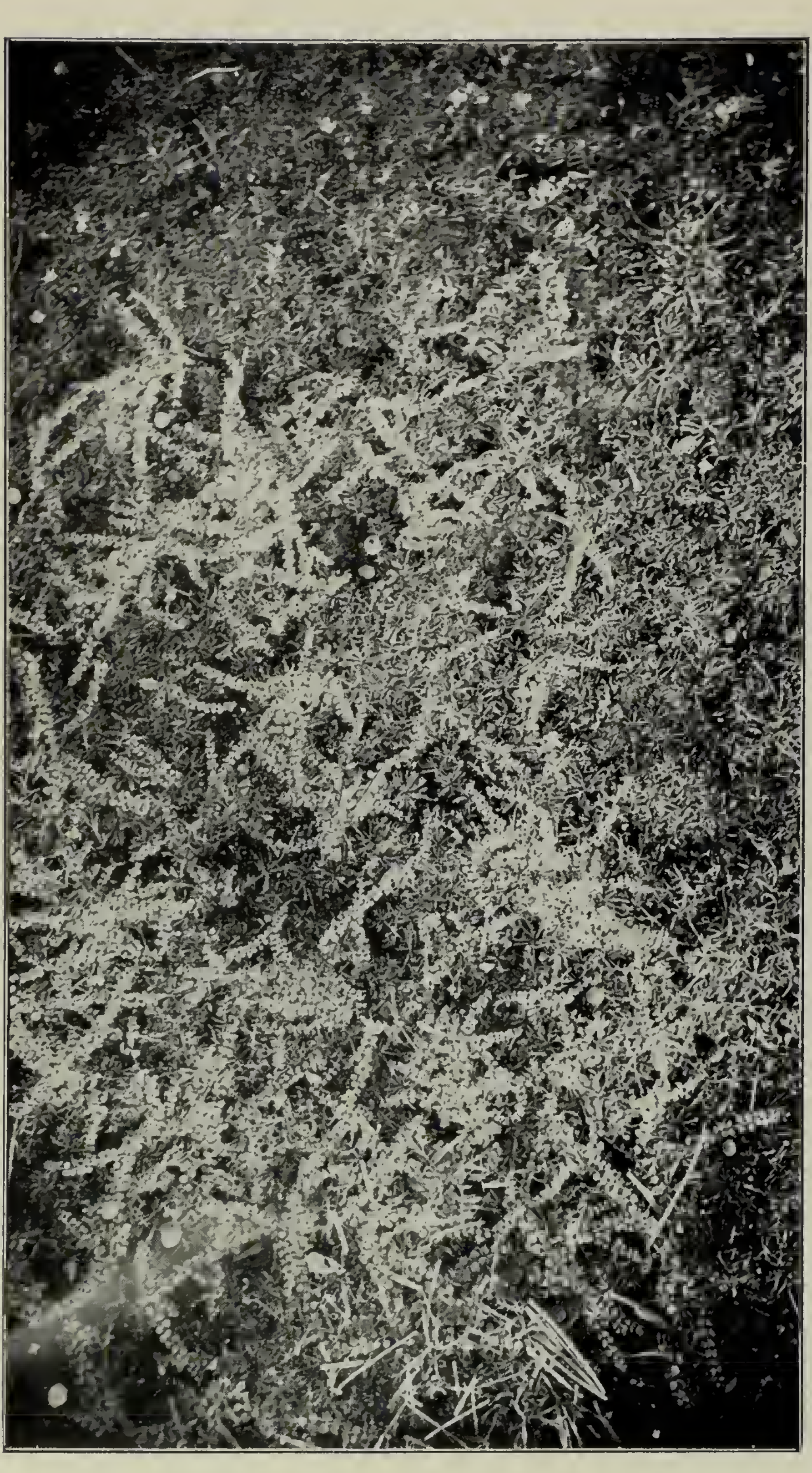

Fig. 24.
ANAGALLIS TENELLA, on dry ground, associated with *Agrostis alba*.

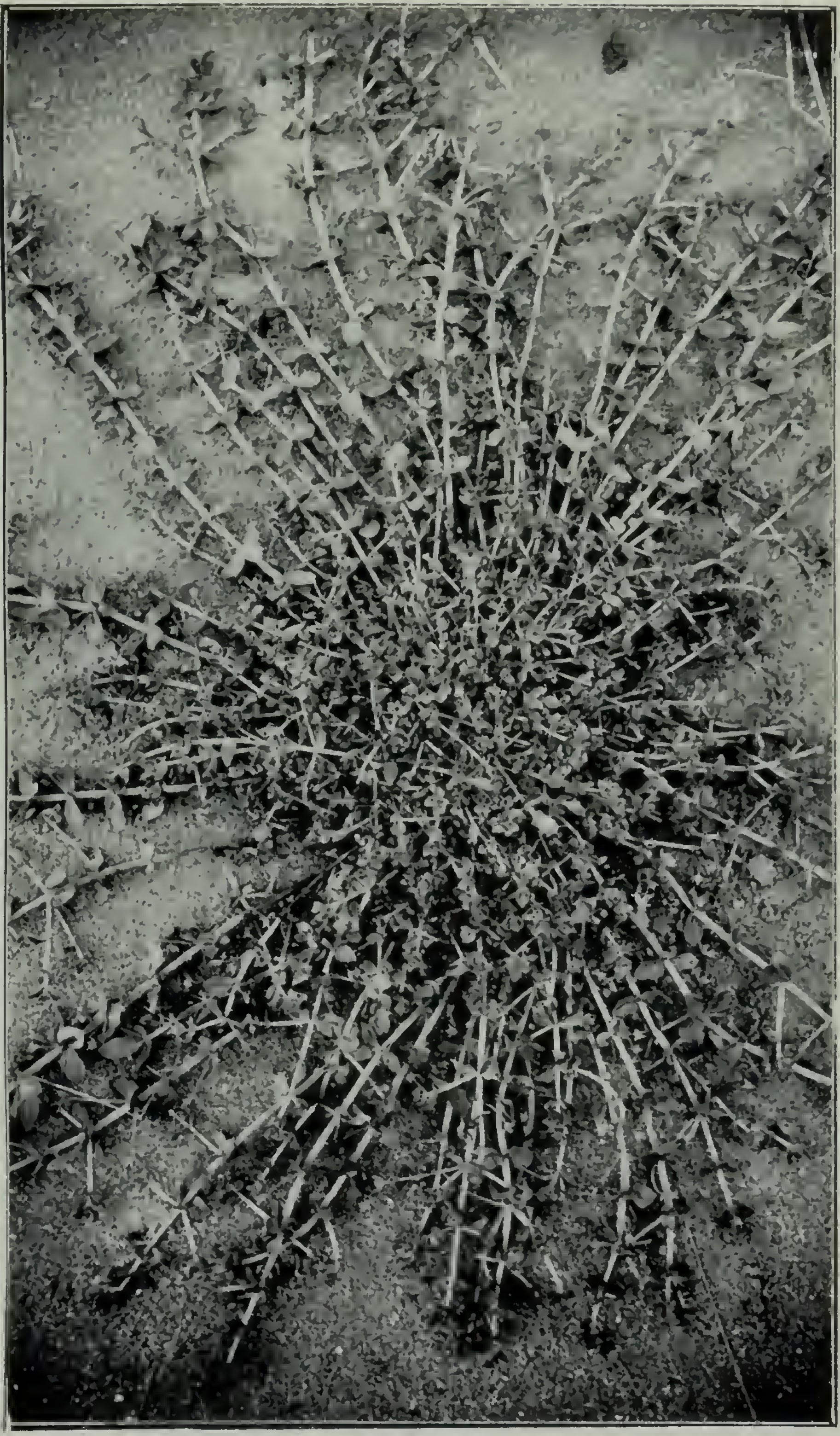

Fig. 25.
ANAGALLIS ARVENSIS.

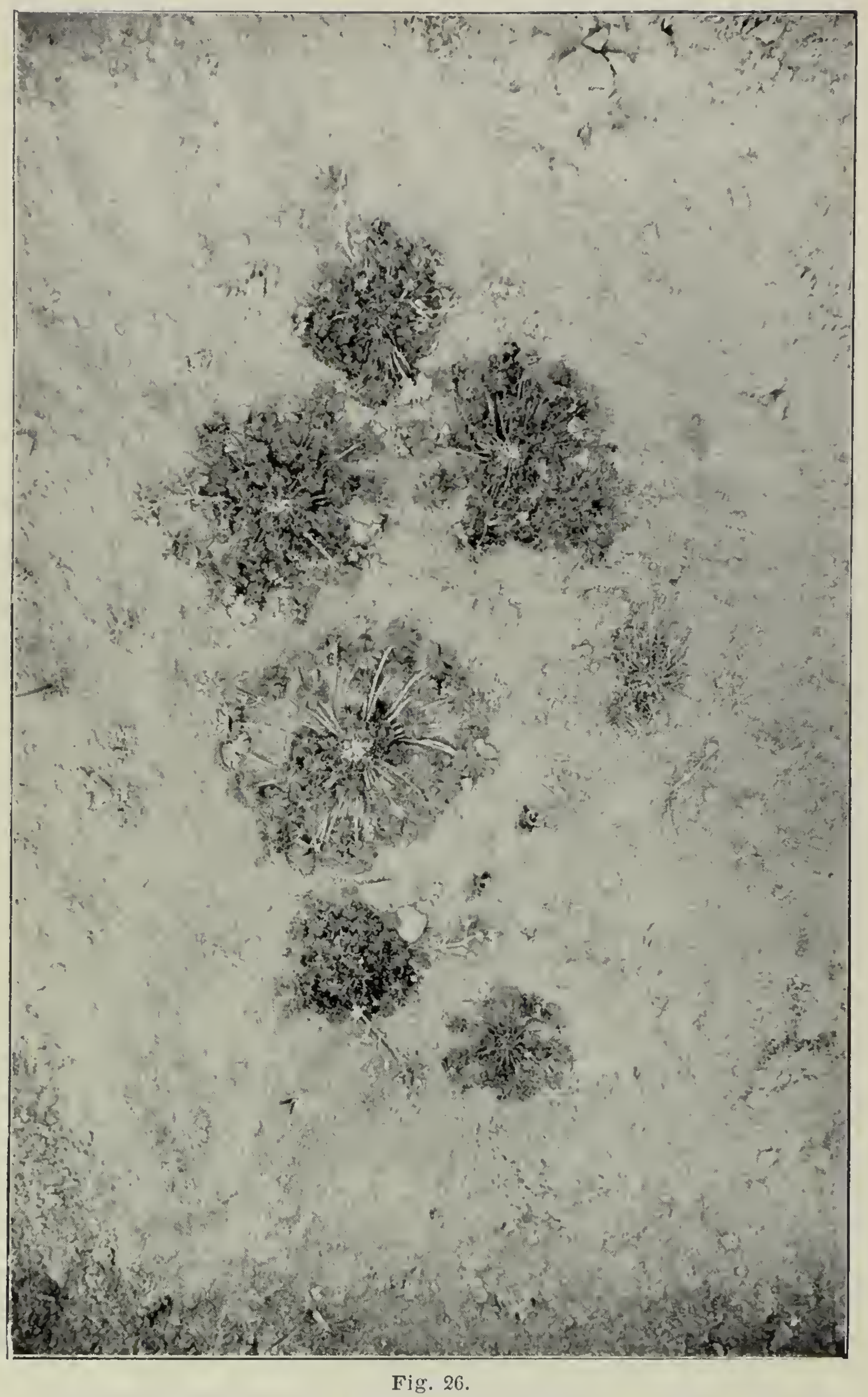

Fig. 26.

GERANIUM MOLLE, rosulate form, with flowering stems arising from lower part of abbreviated main stem.

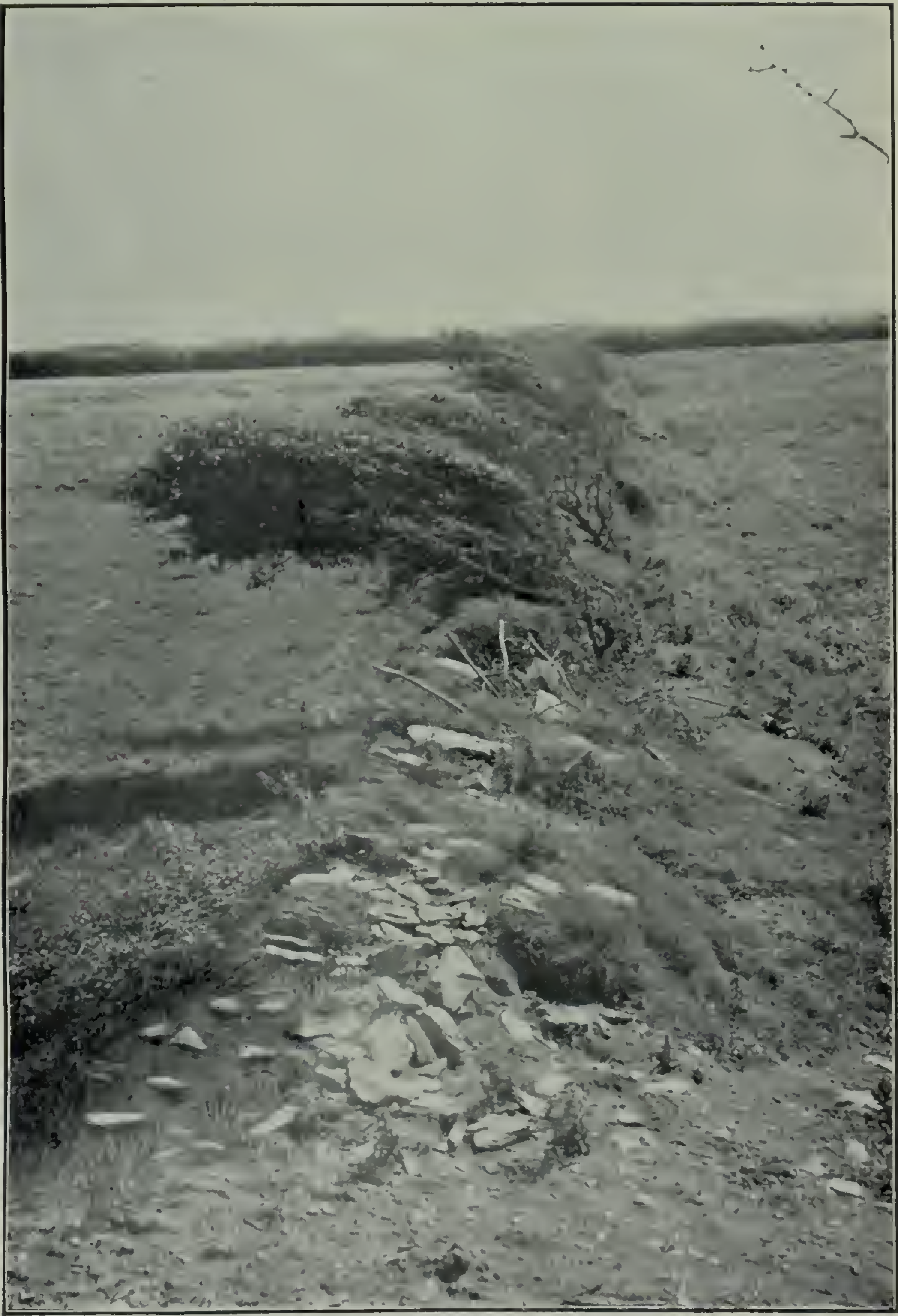

Fig. 27.
HAWTHORN HEDGE, showing wind pruning.

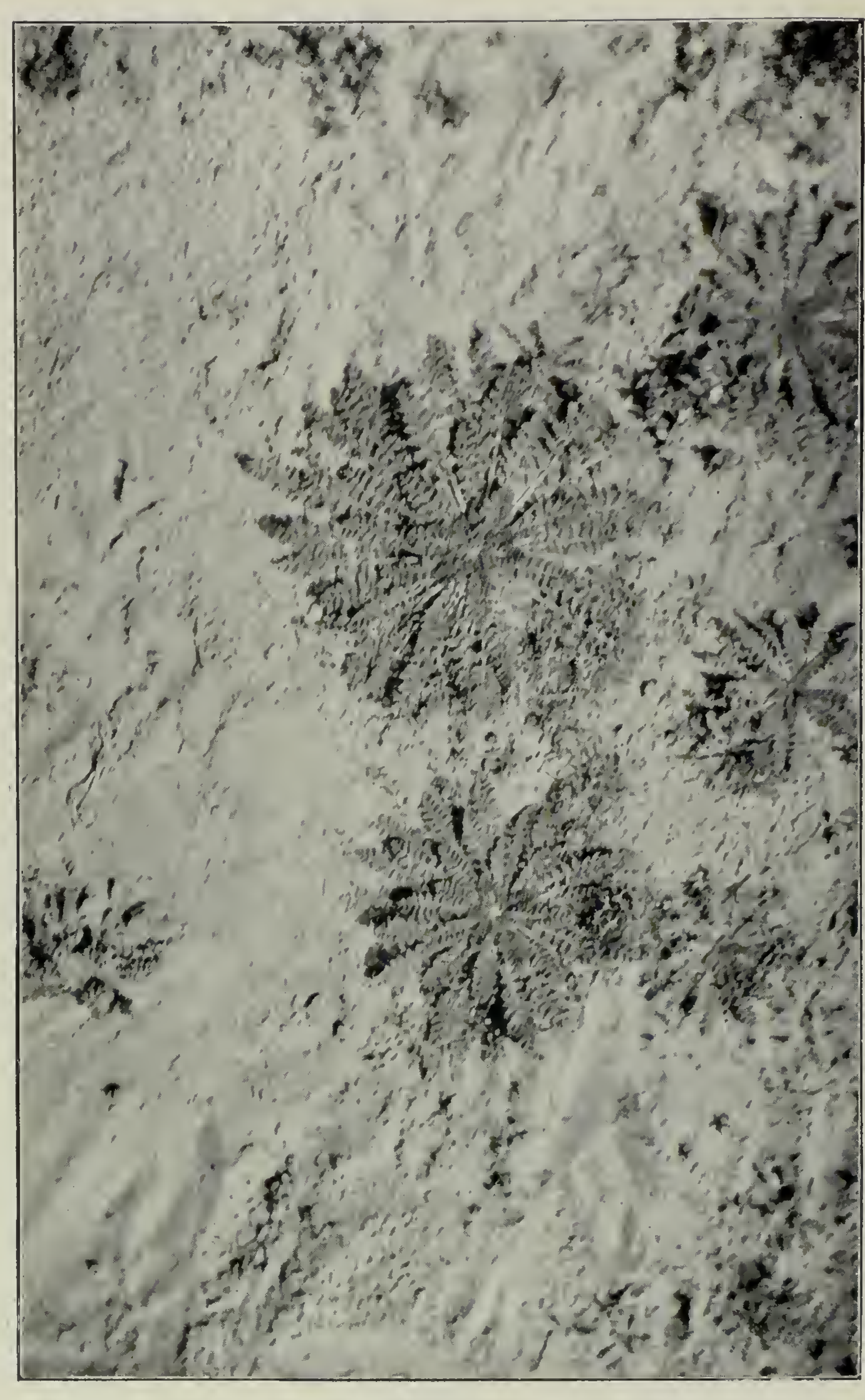

Fig. 28.
ERODIUM CICUTARIUM. Rosettes of vegetative period.

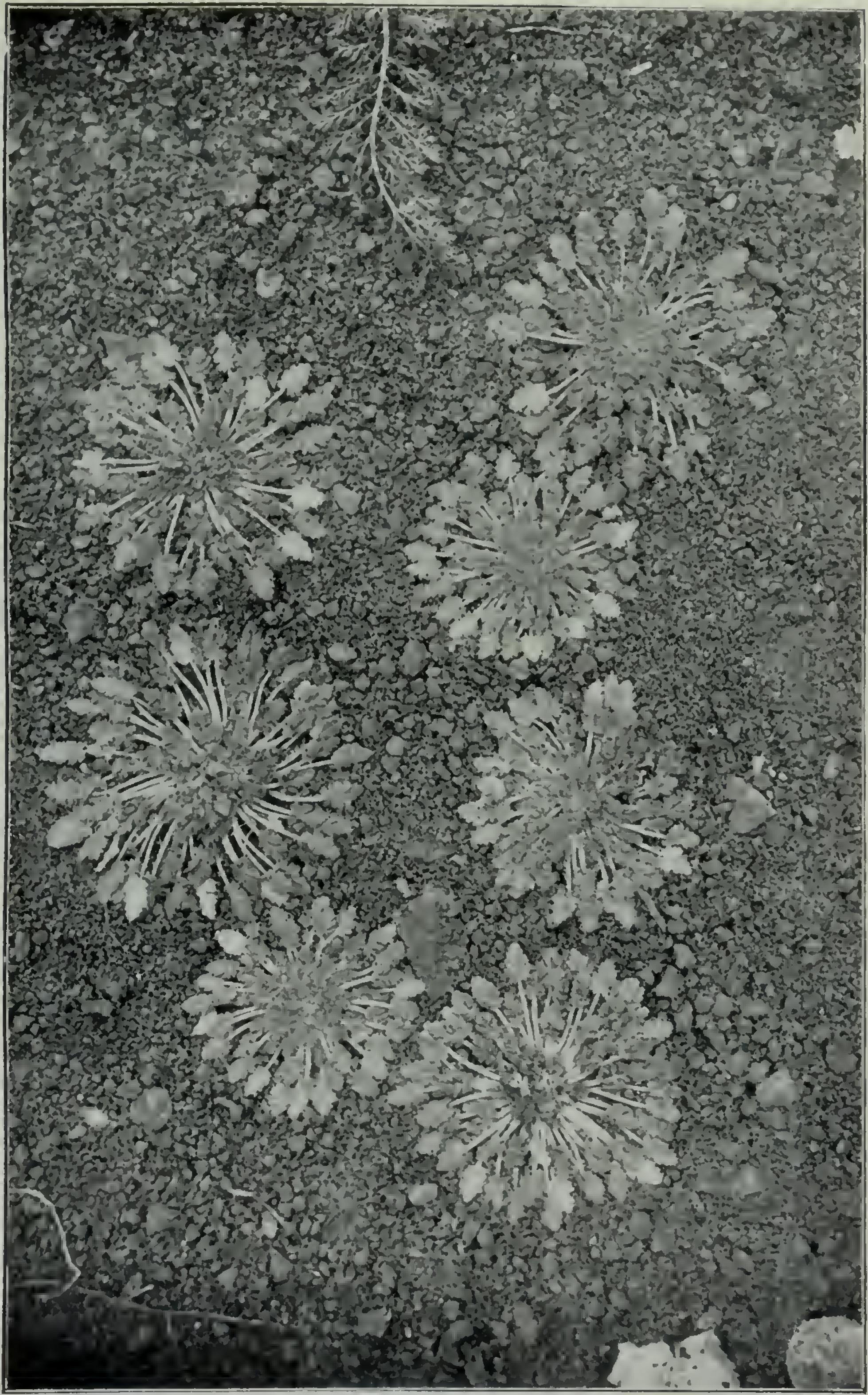

Fig. 29.

ERODIUM MARITIMUM. Beauty of rosettes slightly disturbed by removal of nearby plants.

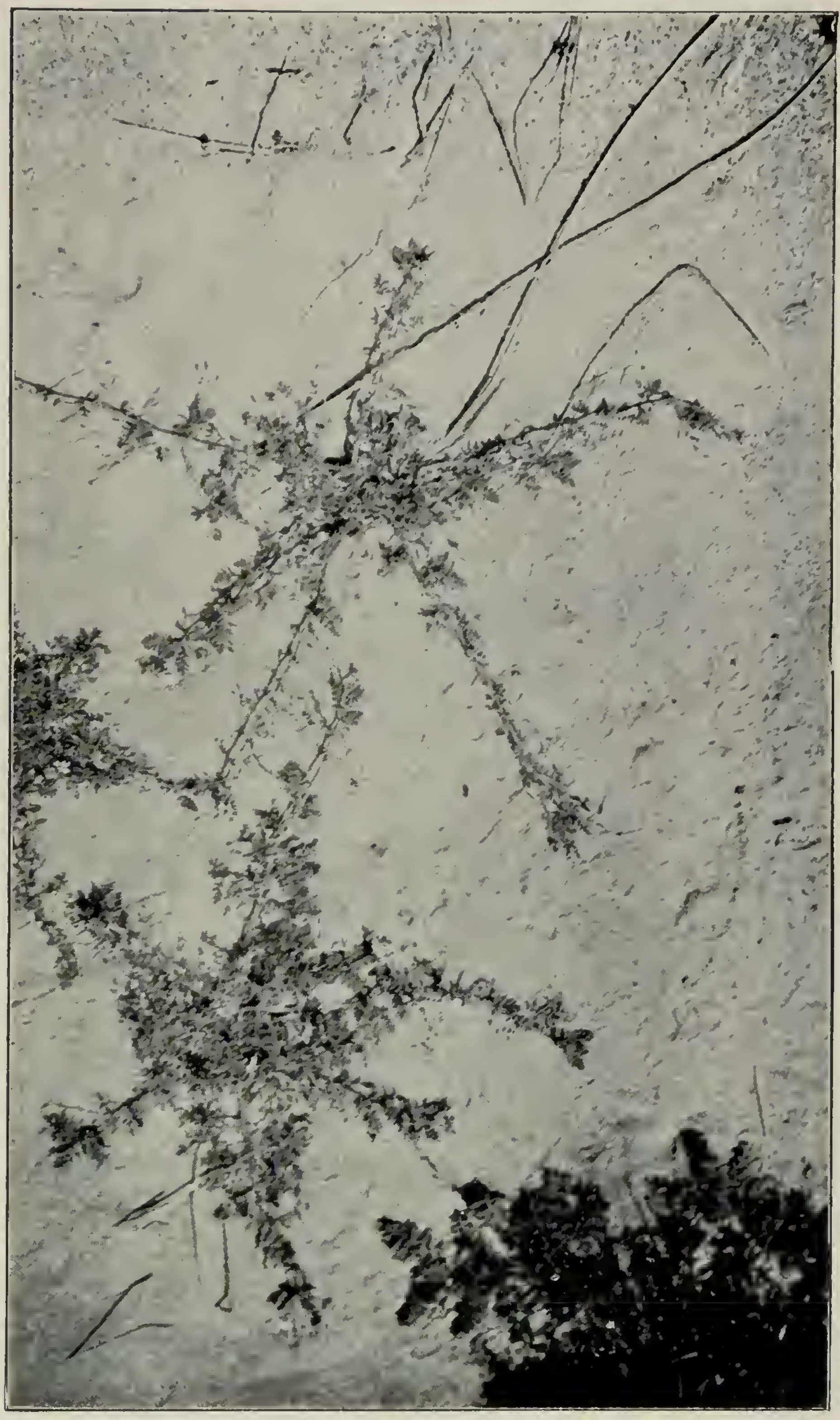

Fig. 30.
ERODIUM CICUTARIUM, in late flowering period.

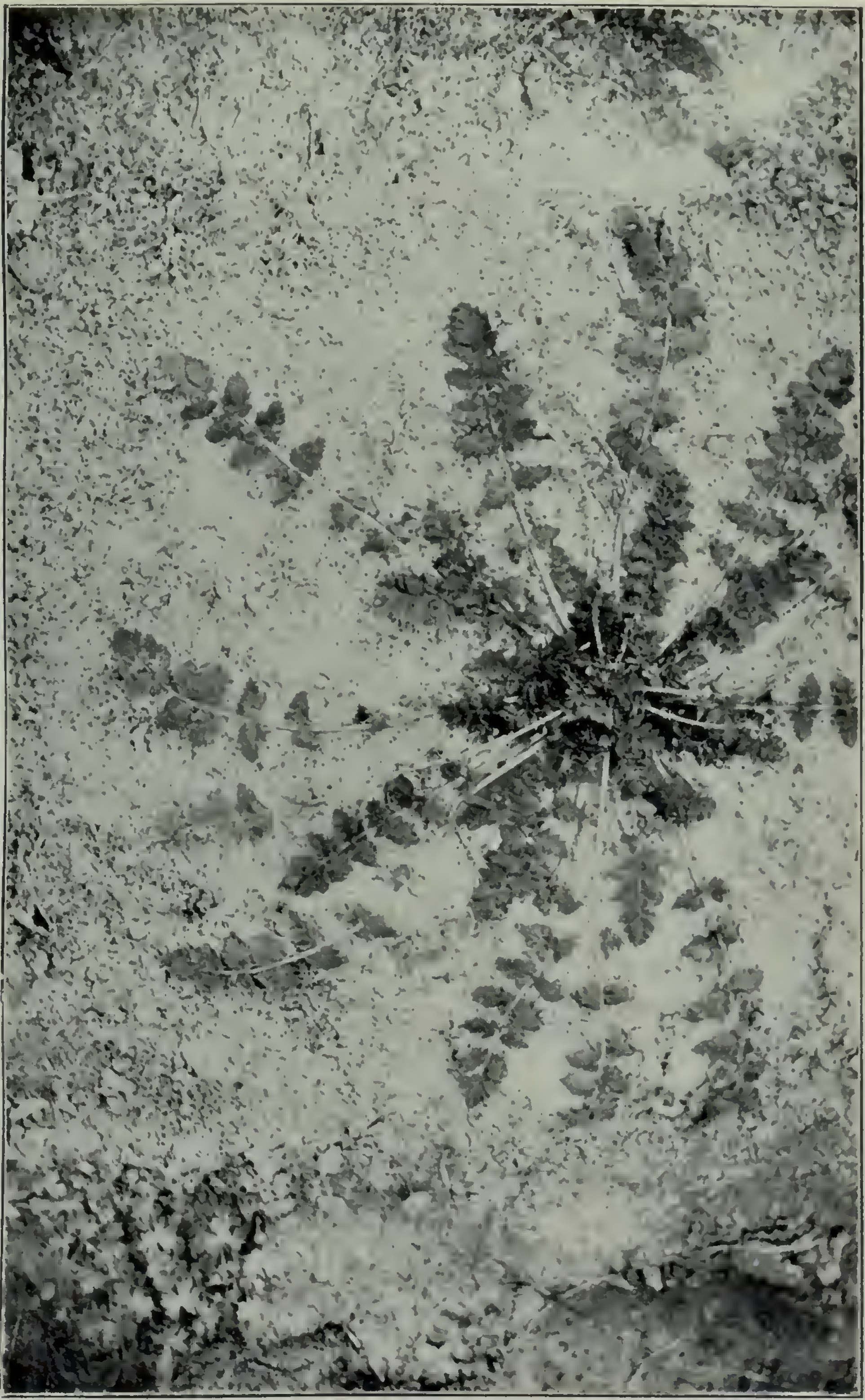

Fig. 31.
ERODIUM CICUTARIUM, plant fed with manure water.

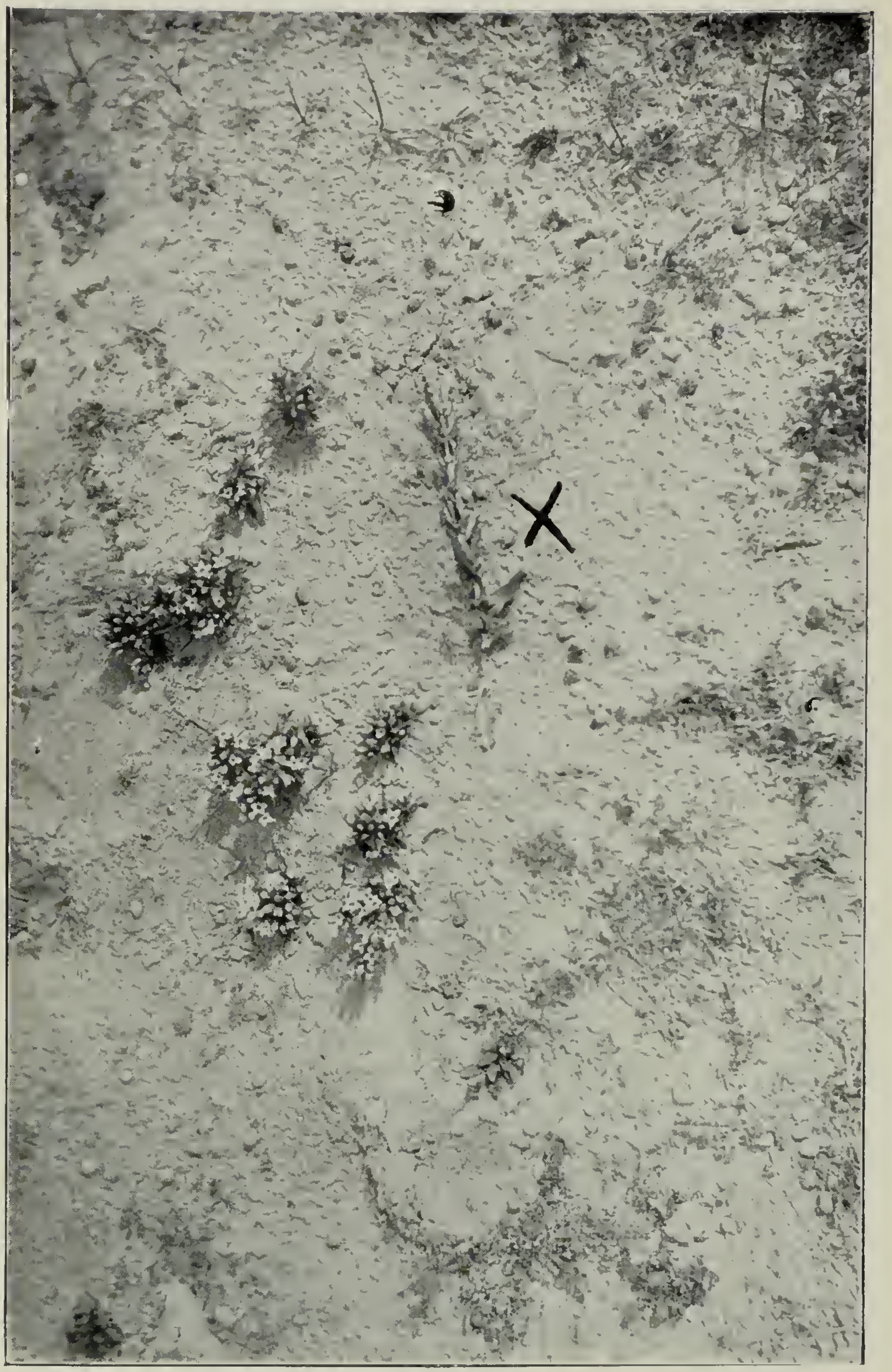

Fig. 32.

GENTIANA AMARELLA, densely tufted form. A more normal plant from meadow land marked X has been laid below.

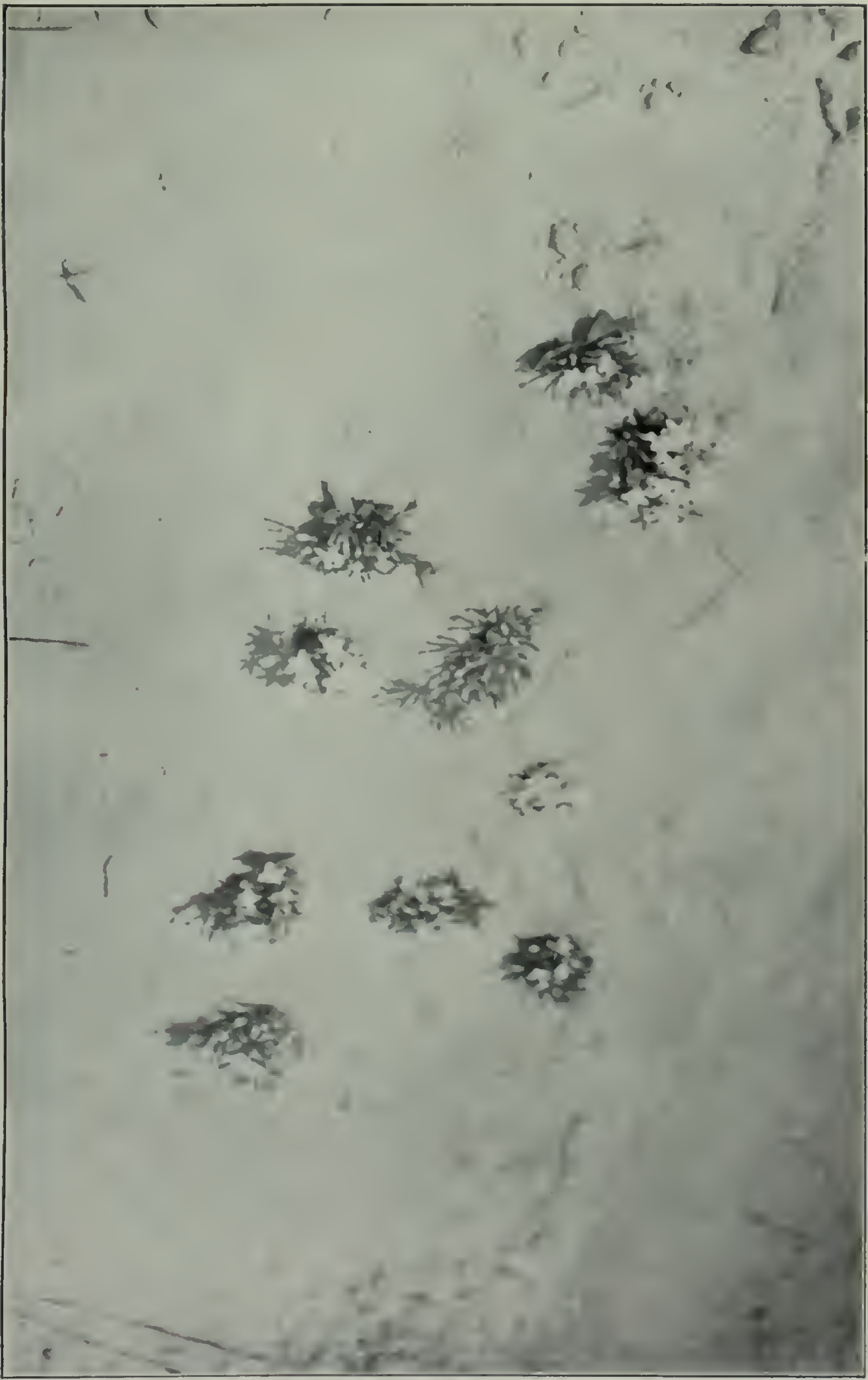

Fig. 33. *CENTAURIUM UMBELLATUM.* Extreme capitate form.

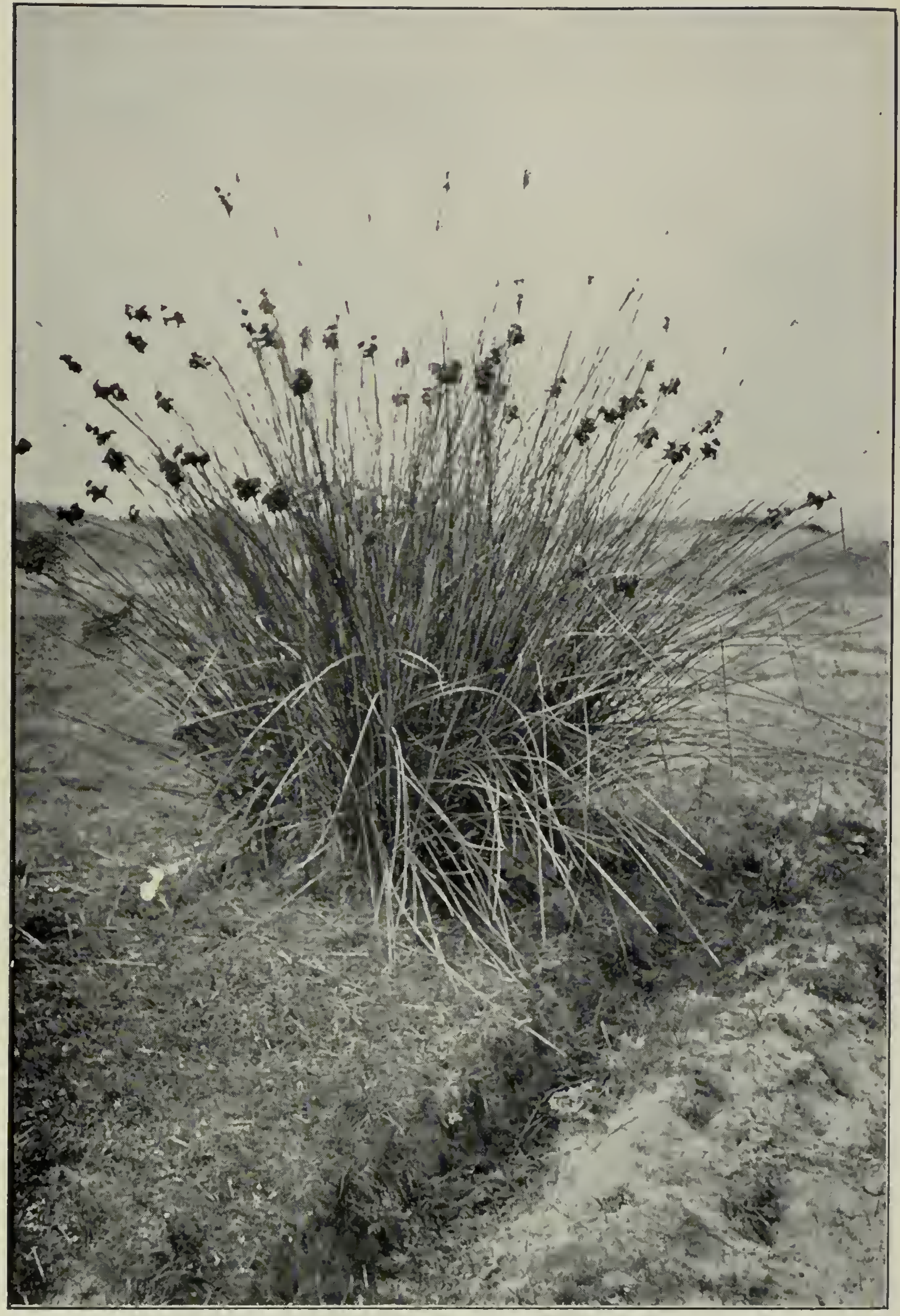

Fig. 34.
JUNCUS ACUTUS. Shows no stunting.

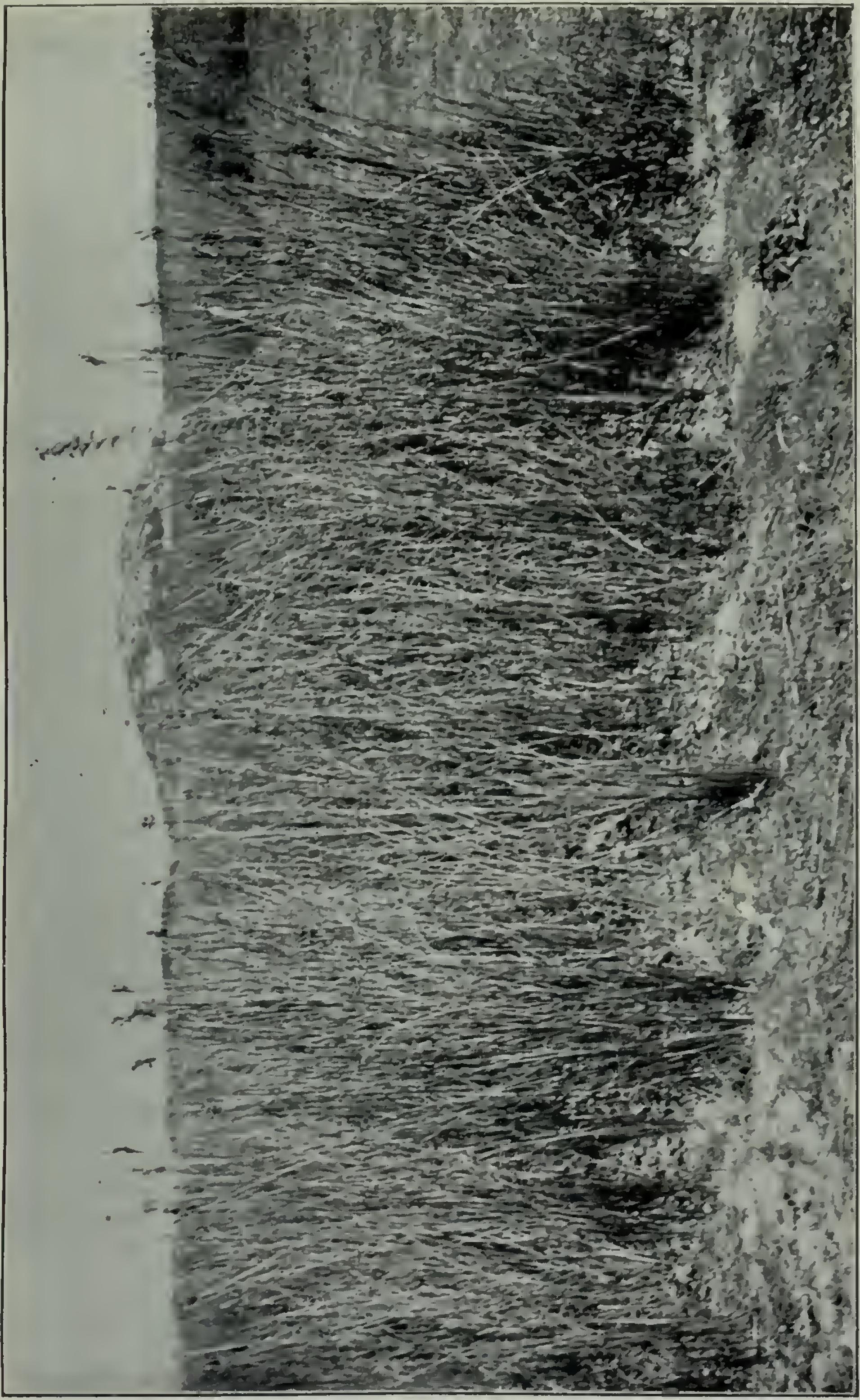

Fig. 35.
JUNCUS MARITIMUS. Shows no stunting.

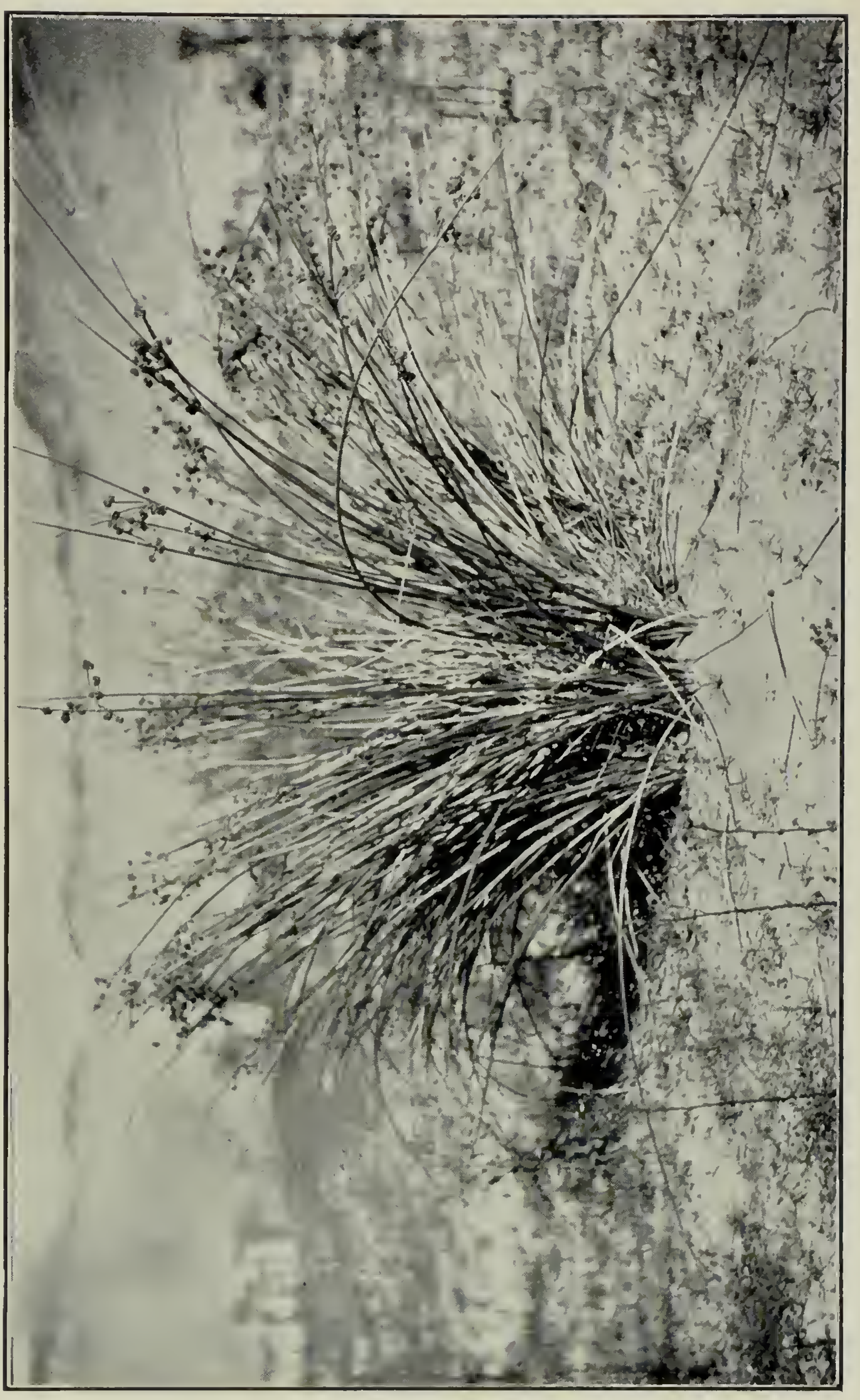

Fig. 36.
SCIRPUS HOLOSCHOENUS. Shows no stunting.

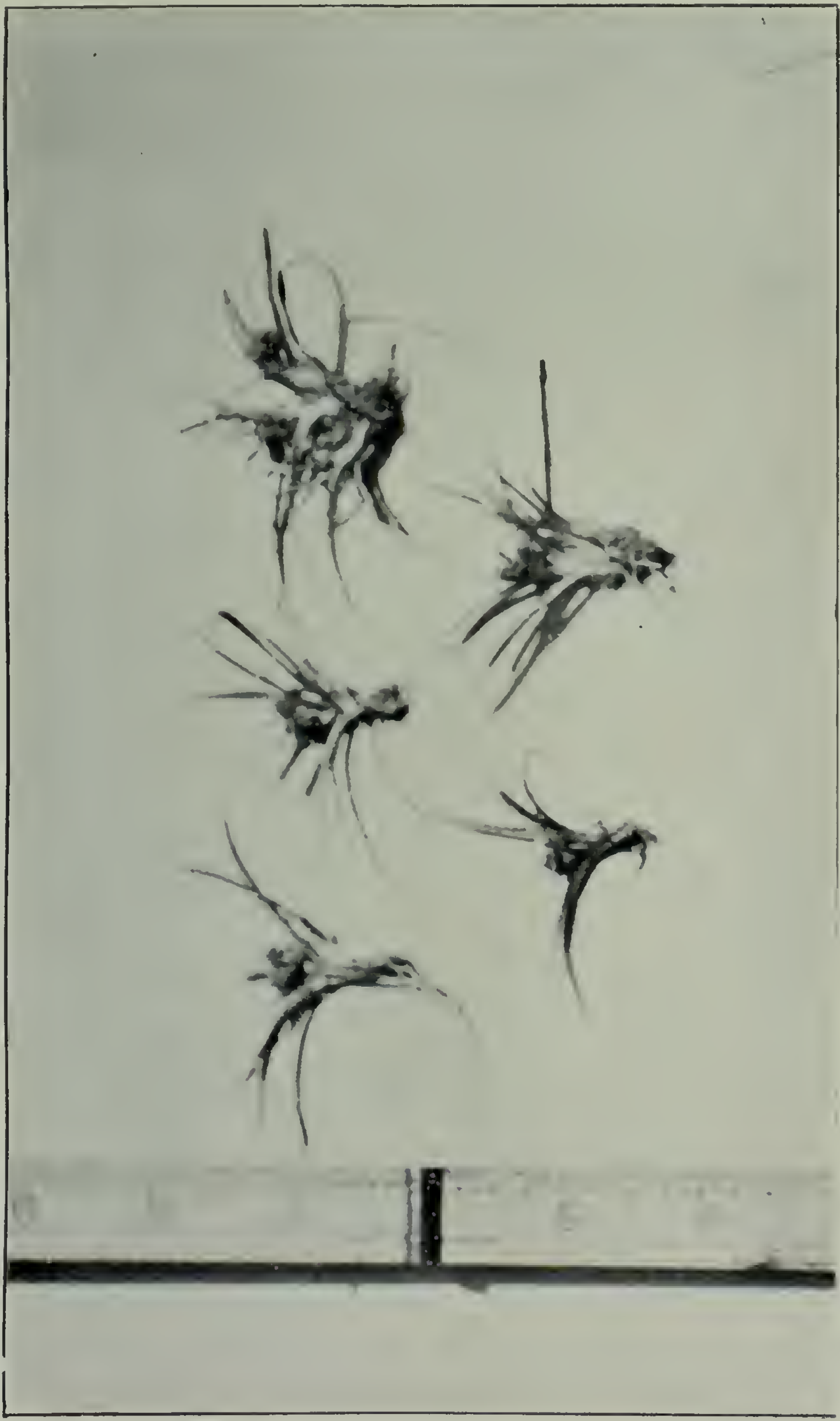

Fig. 37.
CAREX OEDERI. Ground level shown by horizontal line.

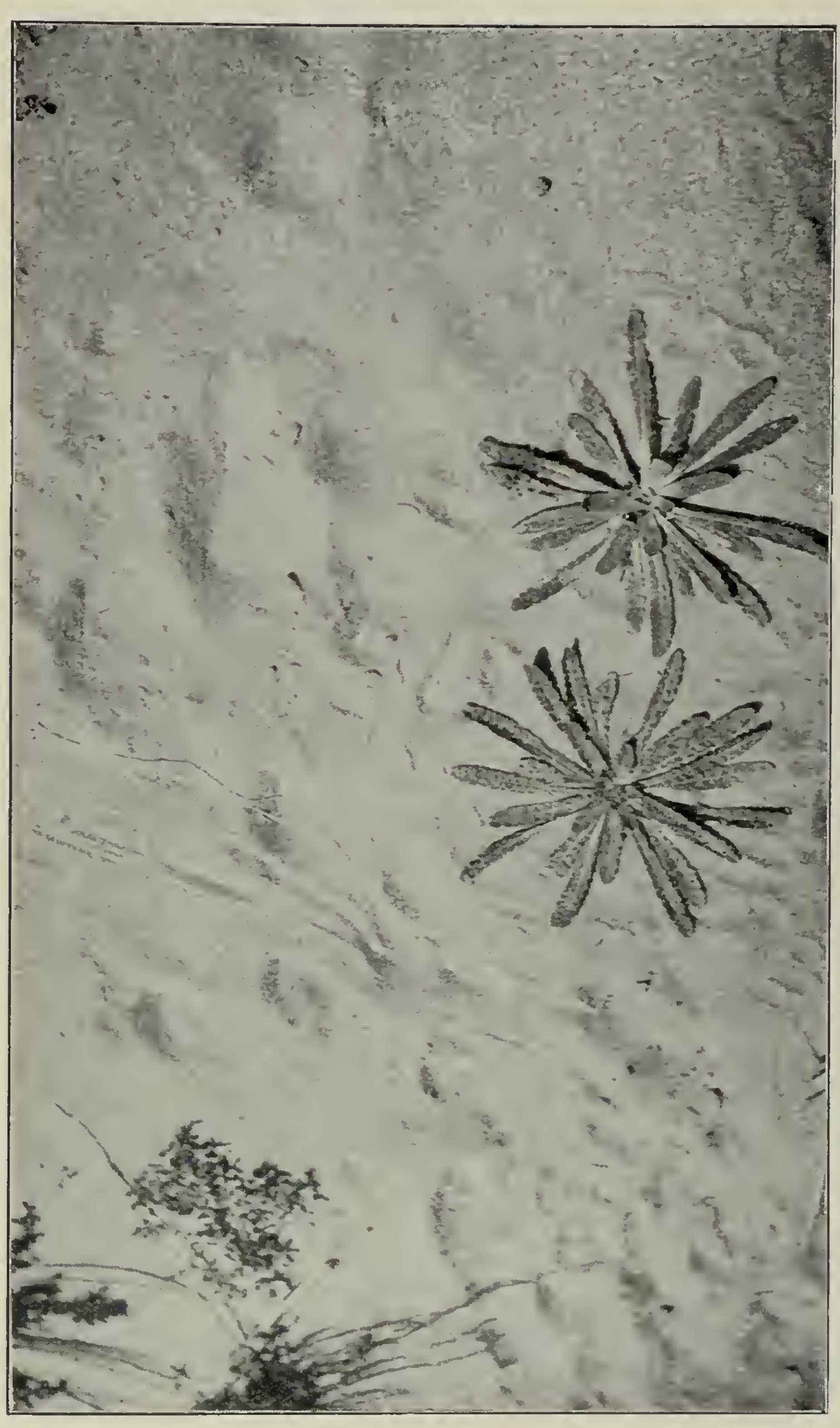

Fig. 38.
RESEDA LUTEOLA.

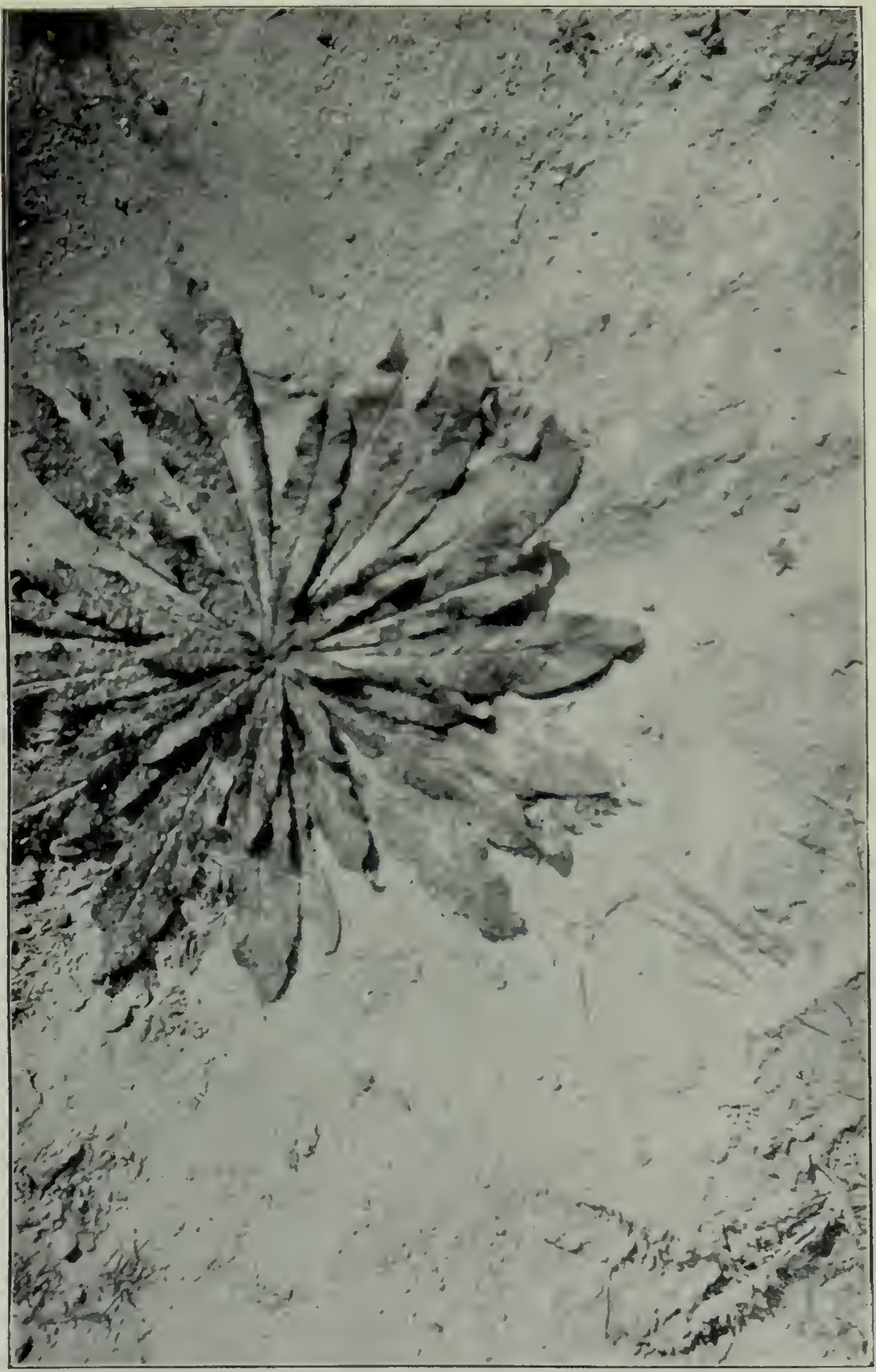

Fig. 39.
ECHIUM VULGARE.

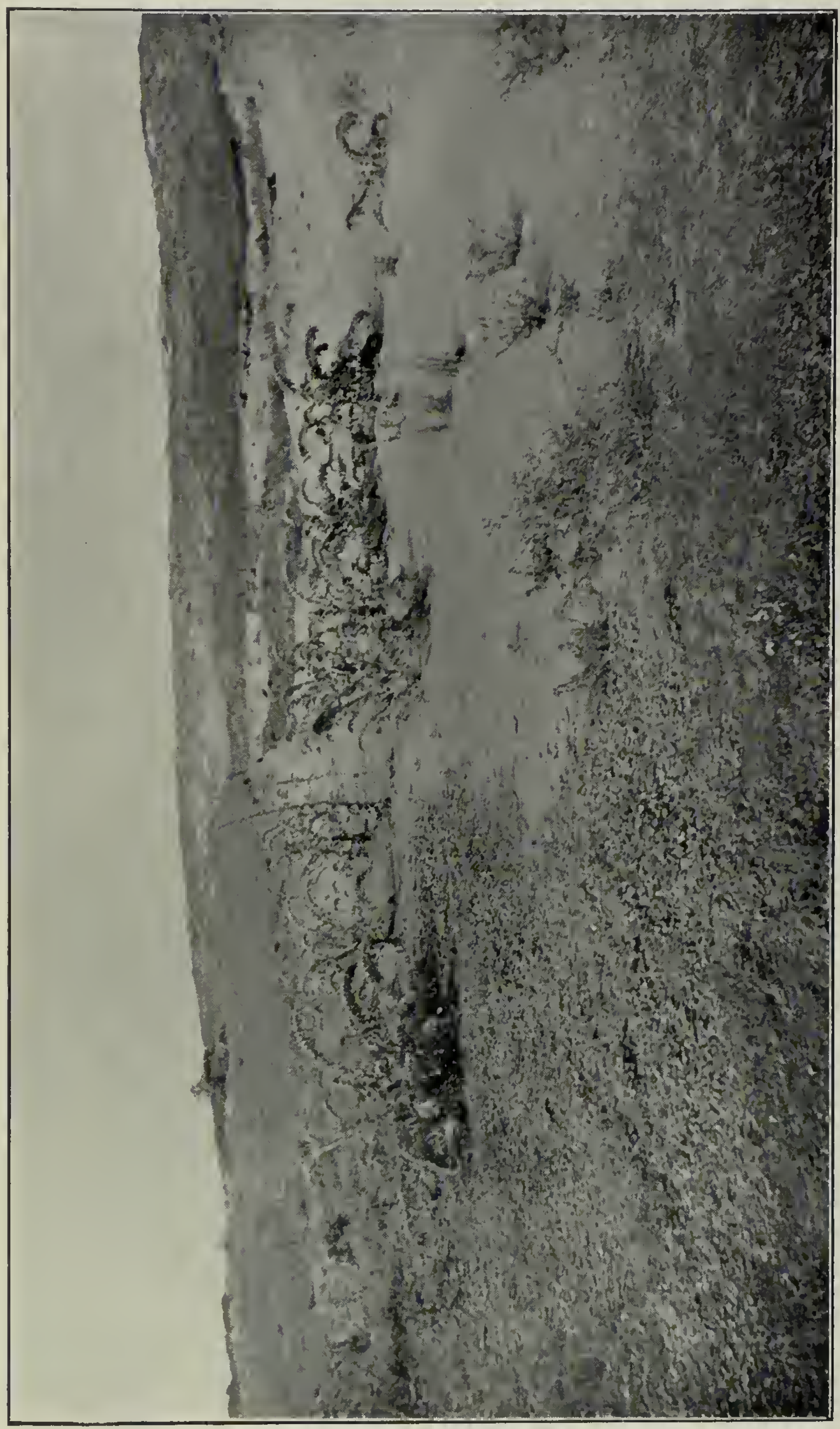

Fig. 40.
HYOSCYAMUS NIGER.

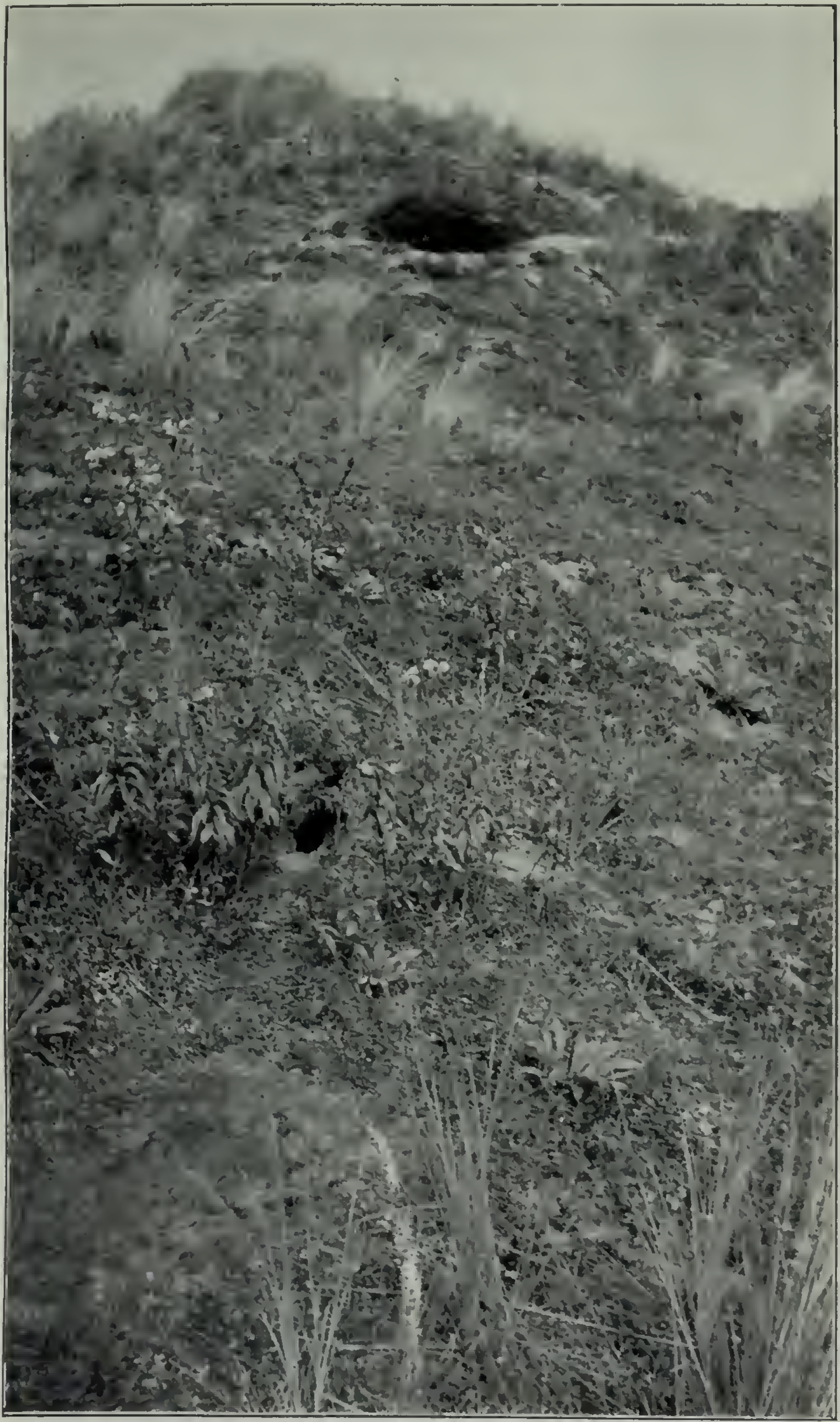

Fig. 40A.

OENOTHERA BIENNIS. Tall plant, shows no stunting in flowering period.

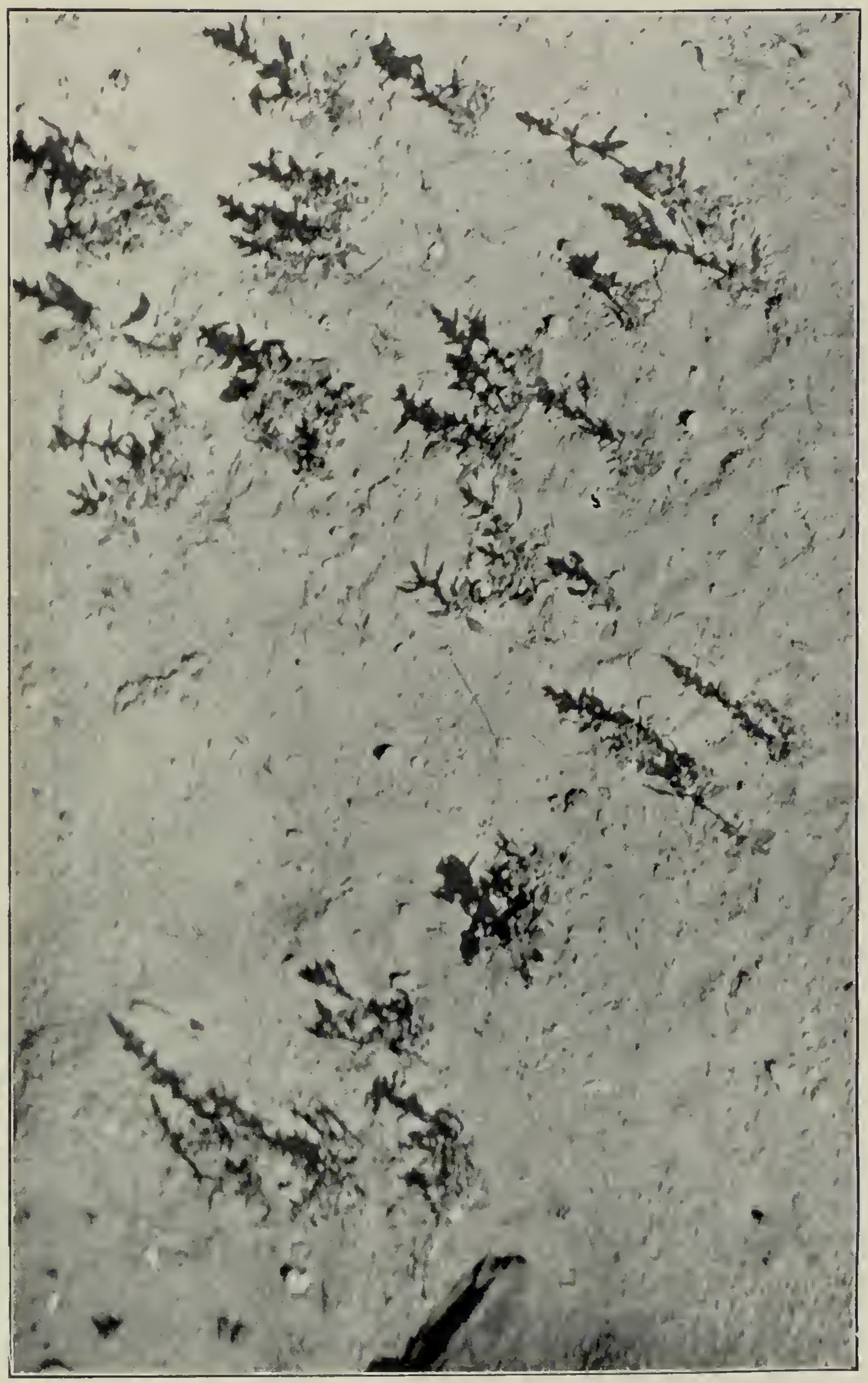

Fig. 41.
CHENOPODIUM RUBRUM, var. *PSEUDO-BOTRYOIDES.*

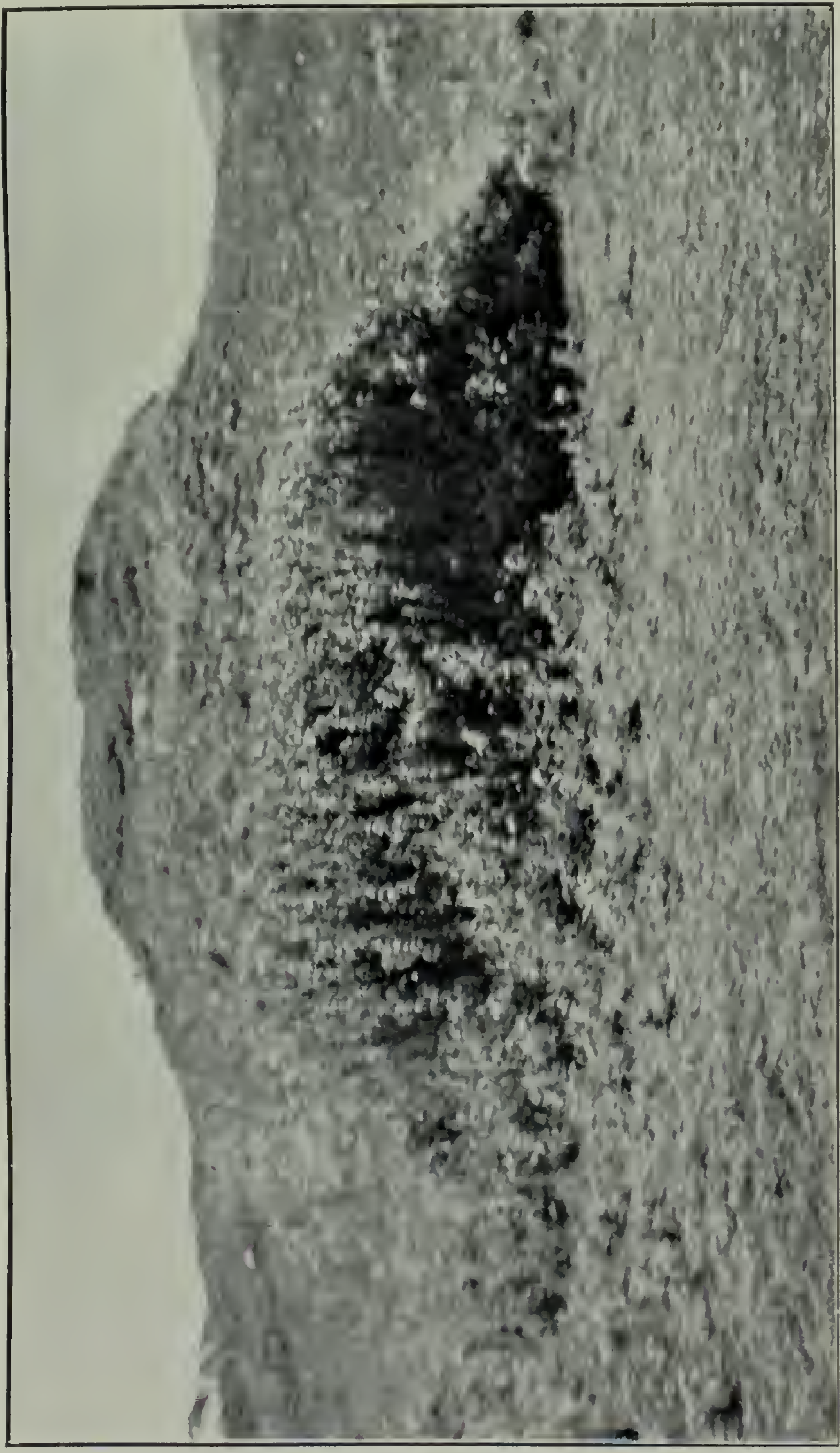

Fig. 42.
CHENOPODIUM RUBRUM, 3 ft. high.

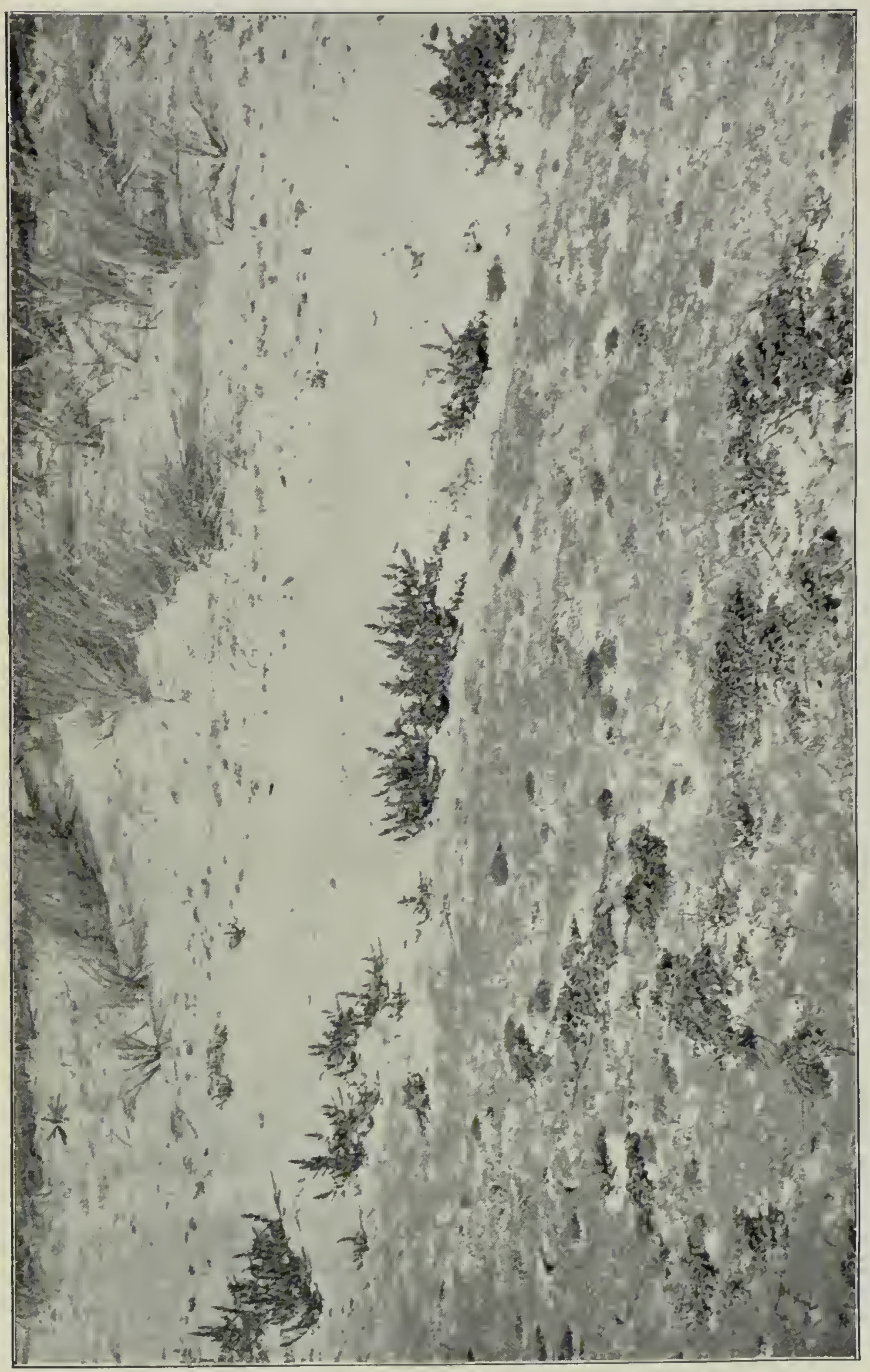

Fig. 43.
CHENOPODIUM RUBRUM. Showing zonal distribution.

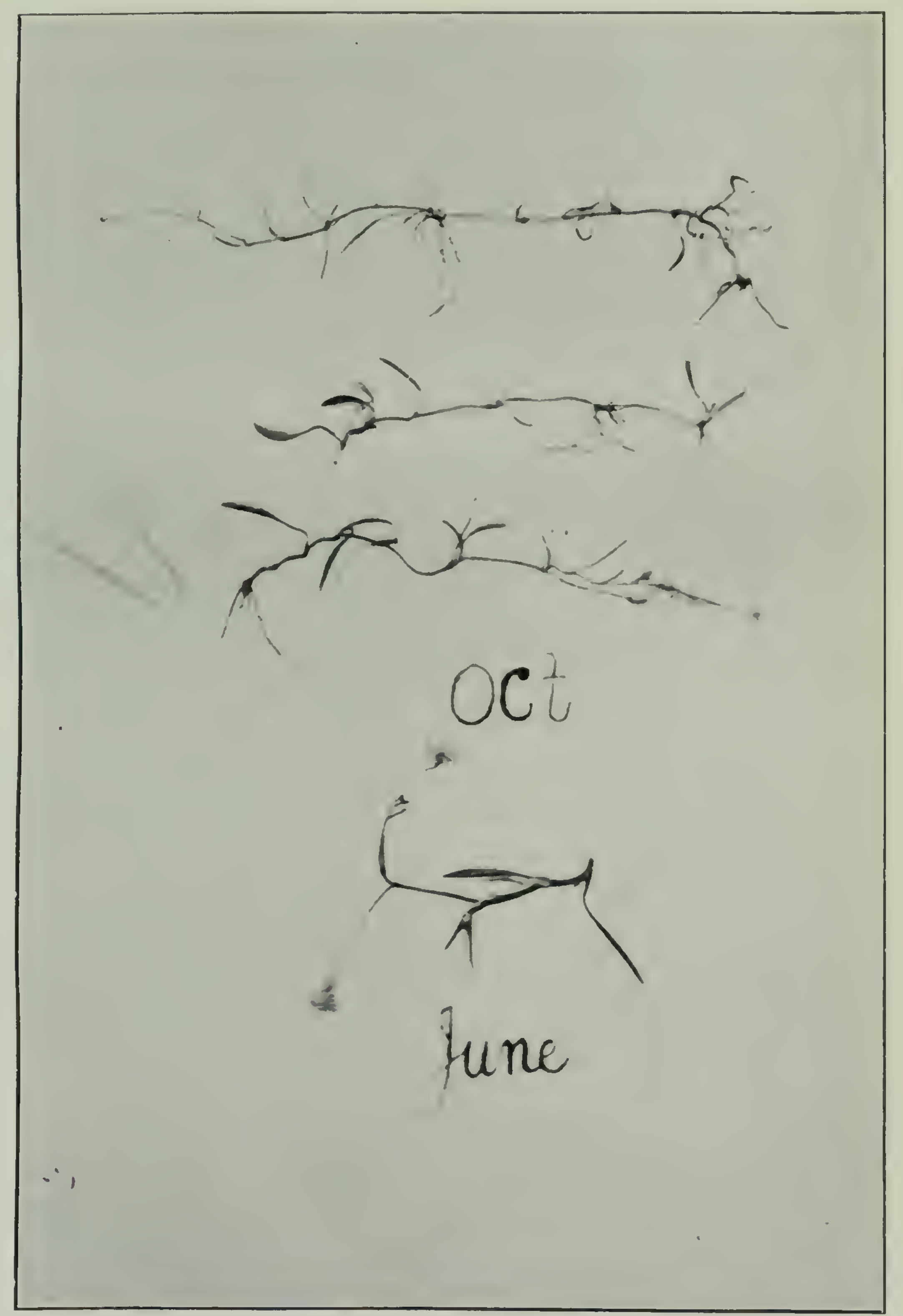

Fig. 44.
RANUNCULUS FLAMMULA.

[illegible]

withdrawn from the outer rays of leaves and their petioles, which gradually turn yellow, then shrivel and decay, the central part of the rosette remaining healthy-looking; fibrous roots are plentifully formed from the cut stump—a very critical period has been tided over successfully.

The importance of maintaining the rosulate leaves closely adpressed to the ground is noticed when another plant is situated in such a position that it encroaches on the growing rosette. Leaves could easily be raised and rest on the surface of the impeding plant, but sooner than do this, a gap is found in the rosette where it impinges on the neighbouring plant. Two plants showing this can be seen in Fig. 26.

What is the stimulus that informs the plant body not to throw out leaves in this direction is beyond us. Similar is the asymmetry of an apple. Where one seed is unfertile, the fruit wall corresponding to this ovule which has not been pollinated fails to develop properly, as something tells the plant body that growth is not needed there.

Bearing on the retention of the prostrate rosulate form when once started, a young rosette of *Erodium cicutarium* was selected in the Burrows, and watered three times a week for six weeks, with half-a-pint of water standing over farmyard manure in a large tub. The result is seen in Fig. 31. Although the plant has got to the blossoming and fruiting stage, the leaves are still prostrate, with great lengthening of petioles and great separation of pinnae, which are less cut than usual. Unfortunately, I was unable to continue the treatment.

Under arctic conditions, we see very similar plagiotropous and rosulate adaptations as we have here, with an absence of tall plants, influenced by snow pressure, wind and light rich in the violet end of the spectrum; but the main effect due to cold is the same as that of excess of heat, namely, deficiency of water.

Another noticeable form of growth in these Burrows, affecting plants which appear unable to adopt prostrate form, is a lowly stature, with a densely tufted condition affecting the flowering parts of the plant, well seen in *Gentiana Amarella* (Fig. 32), which form has been called var. *multicaulis* (Lange), and *Centaurium umbellatum* (Fig. 33), which is an extreme form of var. *capitatum* (Druce).

These forms are, to a great extent, nutritional; growing where there is a relative decrease of all forms of soluble Nitrogen, accumulation of Carbohydrates is produced, which leads to increased fruitfulness, the reverse of the law known to all agriculturalists, that any cause affecting increase of vegetative growth is inhibitory to reproduction.

In situations where the deficiency of Nitrogen and other foods is extreme, we have reduction of all parts, and minute plants of *Centaurium* are found with a single stem supporting a single flower.

Centaurium does, in its first vegetative growth, form rosettes of true sun leaves. Their shining, well-developed cuticle not only protects against transpiration, but, by reflection, prevents absorption of fierce solar rays, and inhibits the passage, especially of the violet end of the spectrum, which is chiefly concerned in transpiration.

The water factor is always dominant here over photosynthesis and respiration. There is a limiting of absorption of nutritive salts, which must be in solution to be available, and when stomata are closed to prevent excessive transpiration, photosynthesis is, of necessity, stopped—so the plant is starved and stunted.

In considering changes in the anatomical form of plants as an adaptation to overcome external difficulties of living in unfavourable situations, the problem that the plant has to face is seldom or never due to one adverse factor, but to several, and to apportion the individual influence of any one adverse factor on the plant is often impossible.

Some plants show a far greater plasticity than others to adapt themselves to new conditions of environment and to fit themselves to survive under these altered conditions, where others would fail, causing them to be rare or disappearing species.

Many plants which thrive well in the Burrows do so not by choice. *Teucrium Scordium*, *Mathiola sinuata*, and others, grow even better in my garden, so long as other plants are kept away from them, but would soon be crowded out if left to struggle for themselves.

Can any distinction be found between the plants which make use of the adaptations we have been discussing, and those which do not?

Speaking generally, I think we can say that normally short plants, roughly under one foot, do more usually so adapt themselves, and that tall plants, roughly of one foot and over, do not.

Erect plants which show normally secondary vegetative branching of the stele must more readily be capable of prostrate adaptations.

Among the Rushes, *J. acutus*, *maritimus*, and *effusus*, which are all tall, with unbranched aphyllous stems, show no alteration of form or stunting. (Fig. 34, Fig. 35, Fig. 36.)

J. articulatus and *bufonius*, branched and leafy shorter plants, show good adaptation, more extreme in *bufonius*, which is naturally the smaller plant. (Fig. 16, Fig. 18.)

Among the Sedges, *C. Oederi*, which is the smallest normally, shows extreme alteration. (Fig. 37.) *C. panicea* is altered to a less extent, and *C. distans* (agg.), the tallest naturally, often shows hardly any change.

In places where taller plants grow, we at once lose the two dimensional flora of the flat dry areas; and where Junceta occur, there are usually two storeys below the tall dominants, one of smaller perennial herbs, and below them mosses and algae growing as shade plants.

The tendency for taller plants must rather be to keep above the more lowly. Several biennials which grow to tall plants, as *Reseda Luteola* and *Echium vulgare*, do, in their first or vegetative period, show marked xerophytic adaptations, which are also advantageous for passing the winter with greater safety. (Fig. 38, Fig. 39.) But in their first year, these plants are " short " plants, and act as such. Later, when the worst weather conditions are past, they show a metamorphosis as " tall " plants.

In citing many plants which show no alteration, as "tall" plants, as *Hyoscyamus niger* (Fig. 40), *Verbascum Thapsus*, or *Euphorbia Paralias*, it must never be forgotten that they all possess very special adaptations in other ways against xerophytic conditions; also by the employment of poisonous substances against rabbits; in the case of the Mullein, although no actual poison is present, the action of the felt on mucous membranes is just as potent.

In looking at the *Euphorbias* and *Sedums*, it seems that a plant having adopted a particular line of defence against some adverse condition seems in some cases to rather concentrate on perfecting this chosen line of defence than to supplement it with others; so that these plants, and others which are adapted for water storage, and the conservation of this water, make little use of hairs and other appliances.

One very variable plant which does not fit in at all with our theories is *Chenopodium rubrum*. In certain places it is found as a minute plant from one to three inches high, in the form known as var. *pseudo-botryoides* (Syme) (Fig. 41), growing where the ground has for a long period been water-logged, with probably an excess of CO_2, great deficiency of O, and there follows deficiency of Nitrates.

A heap of good soil was placed on the Burrows for use on golf-links; over this was thrown a load of sand from the situation where this small form of *C. rubrum* grows. The heap became covered with a profuse, luxuriant growth of type plants of *C. rubrum* up to three feet in height. (Fig. 42.)

In other places, just between damp areas and the Marram-bearing ground, we frequently find an almost zonal distribution of a well-branched, freely-fruiting intermediate form. (Fig. 43.)

The production of runners in plants has probably arisen more or less directly from the adoption of the prostrate form of growth, with vegetative and flowering branches coming off from well below the crown of the abbreviated stem.

Once a stem has become prostrate, light incidence plays its part; in orientation of leaf surface for adaptation to photosynthesis, the leaves all lie in one plane (Fig. 21), bringing the axillary buds in such a position that the future branches will all start in the soil surface plane, these branches lengthening horizontally, developing the habit of rooting first near the parent rosette, then further lengthening of the internodes to a true runner.

This has little or no reference to underground stems, etc., which have an entirely different origin.

An indication as to how this runner production might come about is given by *Ranunculus Flammula*, in its most usual form an upright branching plant. Here it grows in the form known to collectors as var. *tenuifolius* (Wallr.), quite prostrate, though with fairly fleshy shoots in early summer, which do not root, the shoots becoming, as summer passes, increasingly longer and thinner, with many nodes rooting in autumn. (Fig. 44.)

A NOTE ON EXTINCT AND RARE SPECIES OF THE COUNTY OF SOMERSET.

W. D. MILLER.

At a botanical meeting held in London in November, 1928, Dr. Druce gave a short address, in which he enumerated the species which in recent years have been lost to Britain, and those which have been permanently added to our English flora. He maintained that the gains decidedly exceeded the losses. Dr. Druce, however, said nothing about the steady decrease in the number of stations where the rare species may be found, and it is to this point of view that I would direct attention. It is also the case that, while the extinctions are mainly of universally recognised species, the additions are—with few exceptions—highly critical.

It is obvious that the disappearance of a species from a habitat it previously occupied is not always easy to detect, and such detection involves a familiarity with the earlier records and intimate knowledge over many years of some particular area. Individuals of a species may escape notice, particularly of comparatively insignificant plants such as *Centunculus minimus* or *Carex dioica*. Plants which have been searched for in vain for 50 years, or even longer, re-appear in their old stations. Thus our estimate of extinctions must lack finality.

In May, 1927, Dr. E. J. Salisbury, in giving his presidential address to the Botanical Section of the South-Eastern Naturalists' Union, read an interesting paper on " The waning flora of England." In his survey he mentioned only fourteen species which he stated to be extinct or seriously threatened in Somersetshire. Of these fourteen, the following six should not be included—*Cladium Mariscus*, *Drosera anglica*, *Equisetum sylvaticum*, *Lycopodium Selago*, *Schoenus nigricans*, and *Scirpus Holoschoenus;* and one, *Filago apiculata*, was never historically a Somersetshire plant. On the other hand, my list of extinctions reaches the alarming number of twenty-eight, and at least as many more are seriously threatened.

In this paper the authority for the original stations is to be found in Murray's *Flora of Somerset*, and Marshall's *Supplement*, which latter, of course, quotes profusely from White's *Bristol Flora*. A few additional records are taken from Marshall's manuscript notes, and from information supplied to me as Recorder for the last 15 years for the Botanical Section of the Somersetshire Arch. and Nat. Hist. Society. On the other hand, the alleged disappearances are largely the record of my own negative observation or inferences from prolonged absence of information from other sources. As such they are liable to error, and I should greatly appreciate any corrections which more particular knowledge can supply. However, the paper as a whole offers a fairly accurate survey of the present status of the rarer individuals of the Somerset flora.

I have excluded obvious casuals, nor have I attempted to deal with the highly critical genera; it would need very special knowledge to determine which of the brambles, previously recorded, are no longer to be found. Only one grass is mentioned. This is due to the fact that the change in the grass flora of an area is very slow; in fact, there has probably been little change in the grasses of Somerset within historic times. A few species owe their deletion to probable error in the original identification.

EXTINCTIONS.

Brassica oleracea L. Competent authorities (Collins, Flower, Knight) have recorded this plant from Berrow, Brean and Steep Holm so lately as 1887. It is a most conspicuous plant, and I have seen no sign of it, though I have visited Steep Holm at least half-a-dozen times, and am constantly on Brean Down.

Crambe maritima L. Sea-wall at Burnham. Seen by Collins nearly a hundred years ago, and later by Flower. Recorded by St. Brody from Brean (Fl. Weston, pub. 1856). Certainly not there or elsewhere now.

Vicia lutea L. Grew in a sand pit and sandy field at Glastonbury till about 1870. Not seen since.

Parnassia palustris L. Undoubtedly existed on the peat moor 150 years ago, but has been extinct in south-west England for very many years; from Somerset for at least a hundred years.

Lythrum hyssopifolia L. Included by Murray, who in 1872 found two plants in his garden, though probably never more than casual in Somerset. Mentioned because it has disappeared from at least seven other counties. According to the Flora of Jersey it is very rare there, but I have seen it in quantity in one spot.

Eryngium campestre L. Amply vouched on Worle Hill above Weston-super-Mare. Mrs Gregory recorded it up to 1893, and Mr White saw leaves two years later. On Mrs Gregory's information it was thoroughly searched for in 1928—in vain.

Cicuta virosa L. There is a specimen from Catcot Drove in Herb. Watson, dated 1850. Mr H. S. Thompson, A.L.S., recorded it from the same place—or close by—in 1888. It has not been seen since, though the ground is constantly searched, being the locality for *Lathyrus palustris*.

Centaurea calcitrapa L. Murray considered this plant possibly native at the base of Ham Hill, where it was recorded by Sowerby in 1883. There has been no record since, except as a rare casual.

Arnoseris pusilla Gaertn. Recorded by Gapper (Southby) about a hundred years ago—no locality given. There has been no later record. Lamb's Succory is undoubtedly becoming increasingly rare. Druce's *Plant List* gives its vice-comital figure as 23, but Watson (*Top. Bot.*) says it is uncertain in its localities from year to year.

Vaccinium Vitis-Idaea L. Reported with fruiting specimen in 1917 from a remote spot on the Quantock Hills, and immediately lost. The exact locality has been repeatedly searched. The plant is not known from any of the surrounding counties.

Limosella aquatica L. Recorded from Highbridge by Sole in 1791, and from Dunster by Coleman in 1848. These identifications were almost certainly correct, but I have searched likely spots at both stations without success. This, however, is one of the inconspicuous plants which may easily escape notice.

Orobanche purpurea Jacq. This was accepted by Murray from Merridge on the Quantocks, on the authority of W. Tuckwell, 1869. I have no doubt whatever that the plant was *O. minor*, which frequently assumes a striking blue colour. It is most unlikely that the Purple Broomrape was ever a Somerset plant. It certainly is not so now.

Mentha Pulegium L. Accepted by Watson (*Top. Bot.*) on Southby's authority about a hundred years ago. No record since. The plant occurs in all the surrounding counties, but is not now known in Somerset.

Polygonum dumetorum L. The late Mr J. W. White had a specimen from near Keynsham, gathered by Babington in 1836. He was unable to find the plant in the place accurately described by Babington. I have also searched there unsuccessfully for several years.

Polygonum maritimum L. Mr H. S. Thompson gathered a specimen of this on the shore between Burnham and Brean in 1882. The specimen is now in the national herbarium at Kew. There has been no record of the plant since, though *P. Raii* occurs there in profusion.

Daphne Mezereum L. There have been many records of this plant throughout the north of Somerset. Mr White's station at Churchill Batch is extinct. In 1926 I saw a small bush in Eaker Hill Wood, Chewton Mendip, but this had disappeared the following year. I believe the truth to be that the plant is persistently removed from wild stations, and thence bird-sown back into woods. It may occur again, but to-day there do not seem to be any wild plants in the county.

Euphorbia Peplis L. Recorded by Collins from Burnham, 1837, and accepted by Watson. No more recent record, though the ground is frequently searched. The only *Euphorbia* here is *E. paralias*, which could not be mistaken for *E. Peplis*. It is worth remarking that *E. portlandica*, so abundant on both north and south Devon sandhills, is not a Somerset plant, though there are miles of suitable coast line.

Cephalanthera rubra Rich. It is almost impossible that Collins in 1836 could have been mistaken as to this most unmistakable plant, and the record was accepted by Watson and Hooker. With the help of the 1 inch scale geological survey map, I have searched diligently the limestone outcrop in the neighbourhood, both with the late Mr Marshall and alone, without success. *Epipactis latifolia* (agg.) is not uncommon in the district.

Aceras anthropophora R.Br. Mr White (*Fl. Bristol*, 560) has a most interesting note on the occurrence of this plant, almost certainly native, near Clevedon about 30 years ago. Unfortunately, it appears to have been eradicated.

Juncus acutus L. Recorded from two widely separated coastal stations and admitted hesitatingly by Murray. Certainly no longer a Somerset plant, if it ever was.

Cyperus longus L. Till 1887 to be found in one spot at Walton-in-Gordano. At that time the ground was being drained and cultivated, and the plant has since completely disappeared.

Carex dioica L. The last record was from Shapwick in 1855 by L. Jenyns. Not known to-day as a Somerset plant.

Carex Davalliana Sm. The original specimens from Lansdown, Bath, are preserved at the British Museum. Now extinct in Britain.

Cryptogamme crispa Br. Accepted by Murray from near Simonsbath on Exmoor. The evidence given is, however, conflicting. Murray quotes Newman (*British Ferns*). "Mr Nathaniel Ward found a few plants growing about a mile from Simmon's Bath, growing on a stone wall at Challicombe." Challacombe is a village about six miles from Simonsbath, and two miles over the Devon border. Parsley fern may have been introduced on a garden wall there, though it is notoriously difficult to move. Mr Marshall, who botanized much at Simonsbath, does not mention it, nor have I seen it there.

Asplenium lanceolatum Huds. Syme says "Common in Somerset." Our only record is Coleman's list from Selworthy, 1849. Almost certainly an error. At any rate there is no more recent record.

Asplenium germanicum Weiss. Specimens from Oare, dated 1840, and Culbone are preserved at Kew, but the plant cannot now be found.

Lycopodium inundatum L. Appears on Coleman's list for near Minehead, 1849, and the *Flora* gives Staple Fitzpaine about 1850, C. Parish. It does not appear in Parish's list in his own handwriting, dated 1850, and has not been recorded since the middle of the last century.

Pilularia globulifera L. Sole's record 150 years ago from Blackdown, Mendip, was probably correct. Last certain record, Somerset coal canal, Monkton Combe; H. F. Parsons, 1875. Extinct.

PLANTS WITH A PRECARIOUS HOLD IN THE COUNTY.

Myosurus minimus L. Recorded from near Yeovil by Edwards and Sowerby. Murray could not find it, and recent search has been unsuccessful. Casual at Portbury from 1908 for some years. Discovered by Dr. Watson in 1920 on a drove below Curry Rivel Monument, where it continues to thrive and extend its area.

Ranunculus Lingua L. Described as abundant on Glastonbury Moor by Sole, who was a Bath chemist, and lived from 1739 to 1802. It cannot be found there now. Up to a few years ago it was to be found in one spot near Catcott Drove, but in 1928 the rhine was cleaned out and the Spearwort was badly damaged. I have not seen it since, though it may eventually recover. This, however, more or less explains how the plant has disappeared from the Glastonbury end of the moor. It is very fine in at least two places near Yatton. It was introduced at Charterhouse, Mendip, about ten years ago.

Meconopsis cambrica Vig. Maintains for the present its station at Cheddar, in two places close to the road, some dozen plants in each. It is a mystery how its attractive flowers have so far escaped spoliation by the hundreds of visitors who pass daily. Sometimes seen in the west of the county, between the Exe and Barle rivers.

Erysimum cheiranthoides L. Fairly frequent on the peat moor, where White and Marshall considered it might be native, but becoming less common than formerly. Casual elsewhere.

Lepidium latifolium L. Almost destroyed at Berrow—its only station—owing to building. Plants removed to a sandy bank nearby have not lasted, as rabbits seem particularly fond of the leaves.

Teesdalia nudicaulis R.Br. Sowerby's station near East Chinnock rediscovered in 1924 in a struggling condition by Dr. Downes, has now apparently quite gone. In some years a few plants may be seen beside the road on Porlock Hill.

Hutchinsia petraea Br. Whether or no the original records were correct, there is now no hope that this species grows at Cheddar, Uphill, or Worle, and its only station is one small spot under Leigh Woods on the Somerset side of the Avon, where in some years there are dozens of plants. It may be protected somewhat by its insignificance and early flowering, and so long as it persists opposite it may recur, but its status as a Somerset plant is precarious in the extreme.

Dianthus Armeria L. Mr White calls this plant " native perhaps on limestone hills; casual on waste ground." It still flowers freely, and looks thoroughly native on the site near Yatton, where it has been known for at least 40 years. It is grown freely in gardens, and vies with *Draba muralis* and *Cardamine impatiens* in plaguing the gardener who has once admitted it.

Dianthus deltoides L. A plant or two is sometimes to be found in its only wild station near Keynsham. I have not seen it since 1928.

Cerastium arvense L. Originally discovered by Mrs Gregory on Loxton Hill in 1894. In 1927 I searched the hillside carefully with Colonel Watts, but we only saw one plant. Probably still to be found very sparingly on one or two limestone hillsides, but exceedingly rare.

Althaea hirsuta L. The only station in Coplay Wood, near Somerton, has persisted for at least 50 years. Murray thought it native. In some years a dozen or more plants mature; more than once I have been unable to find a single specimen. In recent years Mr Rayner has recorded it as a casual in Hampshire, and Lady Davy noted a single plant at Woolacombe in North Devon. In 1927 the Kent station, near Cobham, was ploughed up, and the plant could not be found, but it has been known there since 1798, and has no doubt re-appeared.

Ulex nanus Forster. *Pace* all the authorities, in Somerset I have not seen this species—or at least the *U. nanus* of the Bagshot Sand or Ashdown Forest—except perhaps on Chard Common. Murray says about his records, " not typical " and " I think." Flowers small and pale, with the wings shorter than the keel; primary spines only branched at the base, which gives the plant a distinctive appearance. I very much doubt its occurrence in the south-west of England at all.

Vicia Orobus DC. "Plentiful at Tynings" (*Flora*). About six plants in 1927, though more recently I have seen as many as a dozen. I have not seen it in any other station.

Filago minima Pers. (Fries). Brislington, 1890. (*Flora Bristol*). Mr White could not find the plant again. Brean Down, 1888. D. Fry. Not there now. Steep Holm, 1872. J. Storrie. Not observed there since. Abundant on Loxton Hill, 1920. Miss Roper. I spent some hours there with a competent observer in 1927 without seeing it. Dr. Watson sent me in 1922, from Minehead Warren, a decayed scrap, stated to be this plant. It is a most likely habitat, but no previous or more recent specimens have been forthcoming. Occasionally a few plants occur on a sandy track in Holford Combe. The late Mr Ellman, in 1916, and Mr T. Green, in 1919, noted it on Walton Down, near Clevedon, but I have no recent note from there. I have never seen the plant in the county.

Antennaria dioica Gaertn. An isolated plant of this species has been reported from time to time from half-a-dozen spots in the north of the county. White quotes Mrs Gregory in confirmation of St Brody's Brean Down station, but Mrs Gregory informed me that she picked up a specimen which had been gathered. I have searched the rocky south face of the Down again and again in vain. There were five or six plants high up on the west side of Cheddar Gorge in 1925 (Dr. Watson), and Miss H. M. Dixon found a little patch in a field above Goblin Combe in 1926. Extremely scarce.

Crepis biennis L. Very rare, and now, I think, confined to the extreme north of the county. It has been noted in recent years by Miss Livett at Clevedon, by C. and N. Sandwith at Pensford and Long Ashton, and by Miss Roper at Nailsea. I have been unable to find a plant for some years at the station between Axbridge and Cheddar, where thirty years ago it was so abundant. Most of the ground there is under strawberries, and is kept very clean of weeds.

Hypochaeris glabra L. I have searched for this in vain at Brean and Berrow, stations given in the *Flora*. It is, however, frequent on Minehead Warren, and recent records are Kewstoke Bay (Mrs Gregory), and Purn Hill (Dr. Druce, 1927).

Campanula latifolia L. Continues to thrive at one spot by the Barle, near Dulverton. Marshall thought it might be native there, particularly as it was reliably reported from another (remote) station, though now lost there.

Oxycoccus quadripetala Gill. Apparently extinct at all Murray's stations, and not reported from the peat moors for many years. It has, however, been observed during the last thirty years at two spots on Mendip, two others on the Blagdon Hills, near Churchstanton, and in 1929 on the south face of Dunkery Beacon. It is everywhere confined to a very small area, and very difficult to detect. Though I doubt the stability of the species on Mendip and Dunkery, it will probably be many years before it disappears from the Blagdon Hills.

Andromeda polifolia L. This species was not infrequent on the peat moors up to sixty years ago Dr. Moss records it in 1902, and Mr Marshall in 1905. Extensive peat cutting is responsible for its practical extinction, and no more recent observation has been reported. A tiny patch was discovered on Mendip by Mrs Sandwith in 1914, but I fear it can hardly survive there much longer, even if it still does so.

Pyrola minor L. I do not think this plant is now to be found at Tetton, certainly not associated, as one would expect, with the *Convallaria*. If the Leigh Woods station becomes, or has become, extinct, the species is lost to Somerset.

Centunculus minimus L. This tiny annual has been reported from four or five places widely separated. It will no doubt occur again, but is very rare.

Gentiana campestris L. Discovered by Mr Norman Hadden in two places near Oare in 1920. I have not seen specimens, but have little doubt that the plant is *G. baltica* Murb.

Cuscuta europaea L. Has quite recently become extremely scarce beside the Avon, above and below Bath—its only station—where it has been known since Gerard's time. A small patch was seen in 1926 and 1932, though it was searched for in vain during the intervening years.

Asperugo procumbens L. Has persisted in corn field near Bath for at least a hundred years, and was seen by Mr Green near Twerton as lately as in 1916. It has also persisted near Kewstoke for twenty-five years. Casual in a few other stations.

Linaria repens Miller. Probably native at Locking and Skilgate. Gone now from the latter place, nor have I seen it at the former, though it still occurs as a casual at Clevedon, and possibly elsewhere.

Orobanche elatior Sutton. The classification and identification of this group of Broomrape is unsatisfactory. Mr White never saw the species in the district. Though *Centaurea scabiosa*, the host of restricted *O. elatior*, is abundant on the limestones, the plant itself seems to be confined to the chalk. If it exists as a Somerset plant, it is certainly very rare.

Pinguicula vulgaris L. The history of this species is summed up as follows:—1886, Walton Heath, abundant, D. Fry; 1906, Occasional on the peat moor, C. E. Moss; 1926, Walton Heath, gone from one spot, three or four plants in another place. I have not heard of it since 1928, though its immediate surroundings have apparently suffered no recent change.

Leonurus Cardiaca L. Lost, I believe, at Burnham, and probably in other ancient stations, as I cannot find it at Cheddar or Lympsham. The station at Bossington has been bare for the last two years. Becoming increasingly rare, not only in Somerset.

Chenopodium Vulvaria L. Extinct in all Murray's stations. It was to be found at Bath Gas Works till two or three years ago, but this ancient station now appears to be quite extinct. Though casual occurrences are rarely recorded, it appears to be almost lost as a Somerset plant.

Atriplex portulacoides L. Miss Livett reports that this plant has been flooded out of existence at Clevedon, nor is it to be found at Walton Bay. I believe the small patch at the mouth of the Brue is its only station in the county, and in 1932 this patch was smaller and weaker than I have previously seen it.

Thesium linophyllum Sm. Occurs only in one limited area near Bath, but is not at present in danger of extinction.

Euphorbia pilosa L. Just maintains a struggling existence in its classic station.

Herminium monorchis R.Br. Still to be found very sparingly at Dr. Parsons' station, near Great Elm, now, I believe, the only locality in Somerset.

Tulipa sylvestris L. Still exists at Combe Hay, near Bath, where it spreads over many acres, but rarely, if ever, produces a flower. On a small patch at Wheathill, near Castle Cary, discovered by the late Mr Paterson in 1912, two or three flowers may generally be seen.

Zostera marina L. I can find no trace of this plant at the mouth of the Brue, nor thence to Brean Down, in confirmation of old records. A single strand in good condition was picked up by Miss Miller on Gore Sand in 1928. This is the only recent evidence I have that the plant grows in Somerset at all, in spite of constant examination of high tide leavings along the shore. It may be worth while recording that at certain seasons myriads of duckweed plants are left by the tide for a mile or more along the sand north of Burnham, but I have never seen any form except *Lemna minor*.

Scirpus Holoschoenus L. The single plant found by Mrs Gregory in 1896 is thriving, but does not appear to increase. In 1927 numerous patches of seed from Braunton were sown in its immediate neighbourhood. I very much doubt, however, whether the plant is readily propagated by seed. I found very few mature seeds among the chaffy involucres. At any rate, no seedling plants have appeared.

Rynchospora fusca Ait. The decoy pond near Meare has gone, and with it the Brown Beak-sedge. The Shapwick Heath station, where the plant was observed by Mr Thompson in 1888 was apparently lost, but was rediscovered in 1931 by Mr A. W. Graveson. The plant, about which there is no question, must be extremely scarce, as the locality has been minutely searched by myself and other botanists without success.

Carex divisa Huds. I believe this sedge to have disappeared in all its stations except opposite Hotwells, where Mrs Sandwith found it in 1911, and where it still thrives. It can only have survived so long on the peat moor (Miss Peck saw it in 1906) in the same way as has *Scirpus maritimus*, as it appears to require a saline atmosphere, even when growing in or by fresh water.

Carex extensa Good. Of the recorded stations, this plant had gone from Berrow for many years, until in 1930 three clumps appeared along the edge of the new vegetation on the Gore Flats. In the following year there were seven strong plants, but in 1932 I could only find one. With regard to Brean, White quotes Murray, but the record is not in the

Flora. Not there now. In 1924 Mr H. J. Gibbons discovered this sedge on the coast between Portishead and Walton Bay. There can be only a very few plants of this species in Somerset.

Elymus arenarius L. The small patch at Burnham is seriously threatened by building. Destroyed by cattle at Woodspring. Neither Mr Thompson nor I could find it at Steart, nor do I think it now occurs at Weston. Almost extinct as a Somerset plant.

Asplenium septentrionale Hoffm. Maintains its hold in one spot, though in some years there are only two or three plants.

Equisetum hyemale L. The only station at Weston-super-Mare is being rapidly overwhelmed by rubbish tips and poultry pens. In spite of its vitality, the species cannot last more than a year to two longer.

Equisetum variegatum Schleich. As with *E. hyemale*, the Weston station is being rapidly reclaimed, though the extended area of this species may save it for a few years. With the Horsetails too we are here losing *Blysmus compressus*, *Calamagrostis epigeios*, and *Epipactis palustris.* The plant still occurs in a few damp spots among the sandhills north of Burnham, though everywhere in the weakest state. No Devon botanist seems to be able to confirm the occurrence of this species as a Devon plant at the present day, and it is impossible not to suspect that a depauperate form of *E. palustre* was mistaken for it. Cf. Dr. Druce's note (*B.E.C. Report*, 1931, p. 573). I have seen Dr. Druce's form or variety in South Devon at Thurlestone and Weston Mouth. The type plant is, of course, essentially a northern one, and it appears highly probable that in ten years' time it will be altogether extinct in the southern half of England.

May I conclude with a quotation from Dr. Salisbury's paper mentioned above. "It is unfortunately true that only rarely is the diminution of a species recorded until its extinction is an accomplished fact, and if this address achieves no other object than to stimulate field naturalists to record data of this character, it will have served a useful purpose."

THE PROGRESS OF BIOLOGY—EXPERIMENTS IN GENETICS.

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It is probable that, when looked at in true perspective, 1932 will be found to be a year of notable progress in biology. The advances that have been made are proud achievements in themselves and promise still more rapid progress in these fields in the future.

No more notable progress has been made than that in the physiology of reproduction. Our knowledge of the functional relation of the pituitary body and the ovary has increased with extraordinary rapidity. It is now known that several hormones, or chemical messengers carried by the blood-stream, are concerned in this relationship, which is far more complicated than at first supposed. Many points are still in doubt, but it is abundantly clear that, in the vertebrate animals, hormones secreted by the pituitary body control to a large extent the functional activity of the ovary. Another notable advance in this field is in the biochemistry and standardisation of oestrin, one of the hormones secreted by the ovary. The elucidation of the chemical constitution of this substance has resulted largely from the increase in our knowledge of the sterols.

The discovery that light plays an important part in controlling the periodic recurrence of breeding seasons in certain birds and mammals is of great importance and probably of wide application. It seems clear that, given a certain optimum daily ration of light, many animals can be induced to breed at any time of the year. It has been shown, further, that certain migratory birds in which a breeding season has been artifically introduced by light treatment at an unusual time of the year migrate when released. It would appear, therefore, that the migratory impulse in birds as well as the breeding season is controlled by the light. The mechanism by which light causes the onset of a breeding season is still obscure, but it may be that it does so by increasing the daily period of activity.

Following the work of the last few years on the biochemistry of the vitamins, which resulted in the identification of Vitamin D as calciferol, a derivative of ergosterol, produced in the living organism by the action of ultra-volet light on the latter substance, and the discovery last year that Vitamin A is a substance allied to carotin, the yellow pigment found in carrot, it has been shown in the present year, largely as a result of work carried out in this country, that Vitamin C, the anti-scorbutic factor, is probably a hexuronic acid, a simple sugar derivative.

The chemistry and physics of animal development has been receiving increasing attention and promises to become an important branch of zoology. In this sphere a survey of the phosphorous compounds in a number of animals has led to the conclusion that creatine phosphate, which plays an important part in the mechanism of muscular contraction, is characteristic of vertebrates and that its place is taken in invertebrate animals by arginine phosphate. The discovery of such a clearly defined chemical difference between vertebrate and invertebrate animals appears to be of great importance.

Much work has been carried out and progress has been made in the study of growth, both in plants and animals. Increasing recognition has been given to the fact that activity in living cells may be accompanied by the emission of radiations which can be detected by physical methods. It has been claimed, for instance, that when growing cells divide rays are emitted which stimulate division in other cells in their vicinity. The organisation of growth in plants is being investigated also with reference to growth-regulating substances which can be extracted from the plant.

Useful work has also been done on the growth of parts relative to other parts and to the whole in various organisms, chiefly animals.

Steady progress has been made in genetics, both as a pure science and in its applications to plant and animal breeding, and even to human affairs, and in the allied branches of cytology which deal with the structure of those parts of the cell which are concerned with heredity. Both these subjects have become very technical in recent years, and the great results obtained do not admit of brief description. The methods employed have become quantitative and analytical rather than descriptive, and the results can be expressed frequently in mathematical form; all indications that these branches of biology are becoming exact sciences. Moreover, the results achieved in these spheres have led to a new approach to the theory of evolution, based on the mathematical concepts of genetics.

Referring briefly to the results in some of the other branches of biology mention must be made of the steady, if less spectacular, progress in systematic botany and zoology, in entomology, and agricultural botany and mycology, and in ecology, which deals with the numbers and relations to each other and to the environment of wild animals and plants. In this connection it is satisfactory that the preliminary survey of the fauna and flora of Wicken Fen, one of the properties held by the National Trust, has been brought to a successful conclusion during the year.

Another ecological problem, unhappily neither solved nor likely to be in the near future, has forced itself into prominence during the year. We refer to the menace of the musk rat (musquash), first introduced for fur-farming purposes into this country some five years ago, and now occurring wild in large numbers in many areas, causing serious harm to agriculture, water-works, etc.

The re-discovery of the black-capped petrel *Pterodroma haesitata* in Dominica, which was supposed to be extinct for over half a century, and the discovery of *Bathynella*, a small fresh-water animal which belongs to a group of crustacea not previously found in England, near Bath, are both occurrences of zoological importance.

Limitations of space prevent mention of many other aspects of biology in which much progress has been made in 1932. The choice of those examples mentioned above is arbitrary, but they serve to show that biology has been in the forefront of scientific advance and that the importance of its achievements in relation to man's affairs is unsurpassed. The future of biology is bright, but two requisites are necessary for the fuller realisation of its potentialities. In the first place more young men are required to take up biology as a profession (*vide* Report of the Committee on the "Education and Supply of Biologists," H.M. Stationery Office, London, 1932, price 1s. net). In the second place the pure sciences of botany and zoology, fundamental to all branches of biology, must expand and the resources at their disposal, financial and otherwise, must be increased. Otherwise the growth of the various branches of applied biology, growing more rapidly than the mother sciences from which they spring, will be inevitably checked.

WEATHER OF 1932.
STRANGE CONTRASTS AT GREENWICH.

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The following is an abstract of the meteorological observations made at the Royal Observatory, Greenwich, during 1932, up to the evening of December 29.

Temperature.—Mean temperature of the year, 50.7 deg., or 0.6 above normal. Warmest month, August; mean temperature, 67.3 deg., 4.6 deg. above normal; only once equalled (1857) and once exceeded (1911, 69.0 deg.) in August since records were begun in 1841. Coldest month, Feb.; mean temperature, 37.9 deg., 1.9 deg. below normal. Extreme maximum for year, August 19, 98.9 deg.—the highest back to 1841, except for 100.0 deg. on August 9, 1911. Extreme minimum for year, January 1, 20.7 deg. Extreme maximum in sun's rays, July 16, 146.6 deg., exceeded by 0.8 deg. even in the notably cool summer of 1931, and substantially in every other summer back to 1911. Extreme minimum on ground, January 1, 11.8 deg., the lowest for January since 1914.

Highest daily mean temperature, August 19, 81.5 deg., 18.5 deg. above normal, and unequalled on any day back to 1841. Lowest daily mean temperature, February 10, 28.9 deg., 10.4 deg. below normal. Greatest daily range of temperature, August 19, 34.7 deg. (98.9 deg.—64.2 deg.). Months with mean temperature above normal, January (for the twelfth time in last thirteen years), July to September, November, December; below normal, February to June, October.

THE WETTEST MONTH.

Rainfall.—Total amount, 24.7 in.; normal for year, 23.5 in. Number of days with at least 0.01 in., 168; normal, 163. Wettest month, October, 5.37 in., unequalled since 1882; driest month, February, 0.30 in. Largest daily fall, 1.24 in., October, 23. Months with rainfall above normal, April, May, July to October; below normal, January to March, June, November, December.

Sunshine.—Average daily duration, 3 hr. 12 min.; 4 min. greater than in 1931, but with that exception the smallest since comparable records became available in 1897. Mean daily deficiency from the normal, 51 min. Number of days with measurable sunshine (3 min. or more), 277. Longest daily duration, 14 hr. 24 min. (87 per cent. of sun's stay above horizon), June 17. Sunniest month, August; mean daily duration, 6 hr. 7 min. Sunniest fortnight, August 7—20; mean daily duration, 8hr. 19 min. Sunniest week, June 12—18; mean daily duration, 10 hr. 43 min. Months with sunshine in excess of normal, March and December; in defect of normal, all the rest.

WARMTH AFTER FROST.

Notes.—Snow fell on nine days during the year, covering the ground at 9 a.m. on four days—all in February. Greatest wind-pressure, 25.8 lbs. per square foot, January 6. The first spring-time ascent of the thermometer to 60 deg. was delayed until April 22—the latest date ever recorded for this event. On January 3 a minimum temperature of 52.1 deg., normal for June 30 and unequalled in January back to 1841, occurred two days after the sharpest frost of the year.

From August 18—20 the mean maximum temperature was 94.5 deg.—the highest for any three consecutive days back to 1841.

One of the most curious features of 1932 was the incidence of this intense heat towards the close of a summer so markedly deficient in solar radiation that the absolute maximum temperature in the sun's rays was not only well below normal, but the lowest for twenty-two years. For the first time on record the screened thermometer did not once fall more than 0.2 deg. below the freezing point throughout the autumn (September 1 to November 30).

ANNALS OF THE B.E.C.

CHAP. I.: "THE BOTANICAL SOCIETY OF LONDON."

GERTRUDE FOGGITT.

The roots of the B.E.C. strike back far into the Nineteenth Century; in fact in two more years the Society may be considered to have attained its centenary. Its history has been a chequered one, with name and head-quarters changed time and again; nevertheless the continuity has always been preserved, and with it the living spirit, so that we can proudly boast our intimate connection for just on a century with the greatest British Systematists of that time and their work.

The Society's long life falls naturally into three portions—the Botanical Society of London, 1836-1857; the Thirsk Natural History Society, 1857-1865, and what came after up to the present day. The very beginning was on July 27, 1836, at the Crown and Anchor Tavern, Strand, where the Botanical Society of London was born. It was founded at a meeting convened by Daniel A. Cooper. Cooper in those days was a medical student, only 19 years of age, but a most ardent field botanist; for that same year he produced the *Flora Metropolitana, or Botanical Rambles within 30 miles of London (more particularly Surrey and Kent)*, a modest but valuable work, giving not only the localities but also noting the soils on which the plants were to be found. It was later re-printed, and on the strength of it the youthful author was elected an Associate of the Linnean Society. Subsequently he became an assistant in the British Museum, and later an assistant surgeon in the Army, but died young.

It was this bright youth, apparently, who conceived the idea of a Botanical Society whose objects should be "the advancement of Botanical Science in general, but more especially Descriptive and Systematic Botany, by the reading of original papers on the habitats, particular characters, etc., of plants, and by the formation of a Library, Museum, and Herbarium for reference and exchange of specimens." The name first suggested, but quickly changed, was "The Practical Botanists' Society of London." Ladies were eligible as members. The annual subscription was fixed at a guinea. The Council was formed of six members, with Treasurer and Honorary Secretary, the President being Dr John Edward Gray, Assistant and, shortly after, Keeper of the Natural History Department of the British Museum. (He was chief author of the *Natural Arrangement of Plants*, issued in two volumes in 1821, though his father's name—S. F. Gray—appears on the title page).

The Secretary was W. M. Chatterley, who obviously had hunted much with Cooper and contributed many localities to the latter's *Flora Metropolitana*. The members of the Council included G. E. Dennes (later Secretary), C. E. Sowerby, Dr M'Intyre, and Dr Bell Salter. Cooper himself was Curator, and either then or shortly after drew a salary for his work. Later he was succeeded by Arthur Henfrey.

The first meeting was held on October 12 of that year (1836) and the second on November 3. By that time the new-born Society was so flourishing that it was decided to take permanent rooms for Library, Museum, and meetings, and these were found at 11 John Street, Adelphi, and a grand Anniversary Meeting was held on November 29, that date being especially chosen as being the birthday of John Ray.

The report read at the next Anniversary Meeting showed very satisfactory progress. It was stated that 4819 specimens of British plants had been received, of which 1313 had been arranged in the Herbarium, and the Curator distributed the duplicates among the members "in proportion to their contributions." A number of North American plants, collected by the officers of the Hudson Bay Company, had been presented, also a large herbarium of French plants, supposed to have belonged to Jean Jacques Rousseau. Interesting papers had been read. Dr. M'Intyre had given one on the Flora of Warley Common, Essex, where he had found 23 Filices, 136 Monocotyledons, and 522 Dicotyledons, exclusive of Salices. Warley Common, near Brentwood, has suffered small change, and probably retains many of its treasures, but sad fate has befallen Battersea Fields, about which Daniel Cooper read a paper illustrated with a large map, telling of the 406 species that he had found on a piece of ground 1½ miles long by 1 mile broad. A lady member, Miss C. Perry, had also given a paper (with a map) about the plants of Haslemere. Excursions had been made—a custom which might well be revived at the present day—the first being to Woking, a neighbourhood yet full of botanic interest. Kent was also visited. Among the plants sent in by the members no less than three were new to Britain—*Cinclidium stygium*, the rare moorland moss, by Leyland of Halifax; *Claytonia alsinoides*, by William Baxter, the famous Oxford botanist, Curator of the Botanic Garden there, which he made one of the most celebrated in the Kingdom, containing an almost complete collection of living British grasses and willows. The third plant was *Spartina alterniflora*, from Itchen Ferry near Southampton. It was contributed by the Vice-President, Dr. Macreight, but the first record, made in 1836, was by Dr. Bromfield, who was told by a labourer that he had known the grass on Southampton Water for upwards of 20 years.

This was a fine record for the first season of a new Society; nor were the following years in any way behind it. At the Anniversary Meeting of November 29, 1838, the membership roll had increased to 100, of whom 24 were foreign and 34 corresponding members. The receipts were £71/16/6. the expenses £66/16/10. No less than 18,592 plants had been received, including a valuable set of Willows from Baxter, as well as 10,000 foreign specimens, mainly given by H. B. Fielding. Among interesting plants the Rev. A. Bloxam showed a small, slender-stemmed and purple-flowered *Euphrasia* from Seamor Moor, Scarborough, which was doubtless *E. micrantha* (Reichb.). Bloxam later exhibited another plant which he was the first clearly to make known—*Myriophyllum alterniflorum*, gathered in 1839 at Twycross, Leicestershire, the village where that fine botanist was Vicar for 30 years.

It is not only the first recording of British plants that lends special interest to these early records. The first volume of the *Proceedings of the Botanical Society of London*, published in 1839, has a paper which may be fully quoted from because of its particular historic value.

"The following communication, accompanied with drawings, was read from Mr R. H. (later Sir Robert) Schomburgk, dated New Amsterdam, River Berbice, May 11, 1837, on what he considered to be a new species of *Nymphæa*, but which the President had compared with specimens in the Herbarium of the British Museum and was satisfied that it would form a new group intermediate between *Nymphaea* and *Euryale*; and therefore proposed that Mr. Schomburgk's intention of naming it after her present Majesty should be carried into execution, her Majesty having previously granted her permission. It was therefore named *Victoria Regina, and the Society has adopted this plant as its emblem*." (The italics are ours).

As it may not be known to many how or why the B.E.C. came by its familiar badge, Schomburgk's own account may here be abridged, the scientific descriptions being omitted.

"It was on the 1st of January of this year, while contending with the difficulties Nature opposed in different forms to our progress up the river Berbice (in British Guiana), that we arrived at a point where the river expanded and formed a currentless basin. Some object on the southern extremity of this basin attracted my attention. It was impossible to form any idea what it could be, and animating the crew to increase the rate of their paddling, shortly afterwards we were opposite the object which had raised my curiosity. A vegetable wonder! All calamities were forgotten. I felt as a botanist and felt myself rewarded. A gigantic leaf, from five to six feet in diameter; salver shaped, with a broad rim of light green above, and a vivid crimson below, resting upon the water. Quite in character with the wonderful leaf was the luxuriant flower, consisting of many hundred petals, passing in alternate tints from pure white to rose and pink. The smooth water was covered with them, and I rowed from one to the other, and observed always something new to admire. The leaf on its surface is of a bright green. Around the whole margin extends a rim about three to five inches high, on the inside light green, on the outside, like the leaf's lower part, of a bright crimson. The stem of the flower is an inch thick near the calyx, and is studded with sharp elastic prickles. . . . The diameter of the calyx is twelve to thirteen inches, and on it rests the magnificent flower which, when fully developed, covers completely the calyx with its hundred petals. When it first opens it is white, with pink in the middle, which speads over the whole flower the more it advances in age, and it is generally found the next day of a pink colour. As if to enhance its beauty it is sweet-scented. We measured a leaf, which was six feet five inches in diameter, its rim five and a half inches high, and the flower across fifteen inches."

No wonder the Botanical Society waxed almost as enthusiastic as the finder and eagerly approved the proposed "emblem." Their own progress must also have afforded them no little satisfaction. At the 1841 Annual Meeting 142 members were announced, while the Library possessed 220 volumes "many of them valuable works." 24,860 British and 6000 foreign specimens were announced as having been sent in. That year an important event had taken place, which might well be considered a sort of by-product of the Society. It was apparently the work of the Botanical Society of London which encouraged George Luxford to publish in 1838 his *Flora of Reigate*. Luxford was a printer in Ratcliff Highway, but also a keen botanist who became an Associate of the Linnean Society in 1836. He printed his book himself, and its appearance led to his editing for Edward Newman (author of the *History of British Ferns* and the *Letters of Rusticus*) that famous Botanical periodical *The Phytologist*, the first number of which appeared in June 1841. Henceforward, dating from its second number, this magazine chronicled monthly the proceedings of the Botanical Society of London, and the connection between the two was close and abiding.

By the next General Meeting the Society had grown to 152 members, and Hewett Cottrell Watson, who had lately presented 5500 British plants to its Herbarium, was elected a vice-president. This great man did not join the Society in its earliest years, but once a member he quickly became its mainstay, since for long he was the only good critical botanist among the resident London members. All the parcels of flowers were sent down to his home at Thames Ditton for his inspection, and this continued until J. T. Boswell Syme undertook the curatorship, after which such supervision was no longer necessary. He often contributed records of his finds, *e.g.*, *Carex elongata*, abundant in Weybridge Marshes in 1844, Salop being hitherto considered its nearest station.

Early in 1844 (in which year there were 173 members) came another historical milestone—the appearance of the first edition of the *London Catalogue*. Its full title may be quoted, since it explains its name, and stamps its connection with our ancestral Society—"The London Catalogue of British Plants. Published under the direction of the Botanical Society of London. Adapted for an Index Catalogue to British Herbaria, for marking Desiderata in Exchange of Specimens, for indicating the Species of local districts; and for a guide to botanical collectors, by showing the comparative rarity or frequency of the several species. London, William Pamplin—(another mixture of printer and botanist, whose Herbarium ultimately came into the possession of Dr Druce)—Frith Street, Soho." Watson compiled the main catalogue, Edwin Lees (author of that curious work *The Botanical Looker Out*) did the Rubi and the Rev. J. B. Leefe the Salices. The number of species is thus summed up:—

Indigenous Species	1315
Naturalised Species	132
Excluded Species	102
Varieties	495
	2044

The work was received with general acclamation, but also with the inevitable criticisms (notably by Joseph Sidebotham of Manchester) of species left out or wrongly included, and, above all, the eternal question of nomenclature In looking through the botanical journals and annals of ninety years ago the seeker cannot but be struck by the wonderful resemblance to the present day. There are the same disputes between " lumpers " and " splitters " (though not so named), the same sensitive feelings, the same generosity and kindliness, the same nervous fears that rare plants are being exterminated. It is curious to read how one gentleman had visited Cheddar Gorge and was convinced the *Dianthus cæsius* was practically extinct there, owing to the depredations of the natives, who dug it up and sold it to the trippers. The Steep Holme peony is reported as " nearly destroyed by destructive visitors " in 1836. *Saxifraga cernua* was considered doomed sixty years ago; while *Sonchus palustris* was held to be extinct in England for quite a long time, the Greenwich and Woolwich plants having disappeared, and the Medway and Norfolk ones apparently not yet realised.

The *London Catalogue* quickly went through its first two editions, and at the Annual Meeting of 1849 Watson was requested to compile a third. It is perhaps of interest here to record what Watson wrote about the Botanical Society, 24 years later, in an early edition of his *Topographical Botany*. It is eminently characteristic of the man himself.

" The one-time active Secretary of the Botanical Society of London, the late Mr. George Dennes, really knew but little of botany; he was never able to name a plant from book description. Yet through the aid of the numbers to the specific names in the *London Catalogue* he found it sufficiently easy to look out, or assist in looking out, the desiderata of members. He and I together have looked out upwards of a score of desiderata lists on a Christmas Day morning, and some of them not at all short lists. At its best days the London Society mustered about two hundred members; and the main annual distributions were usually got through in December or January, while done by the Secretary (much tied by his professional duties) and myself. I wish particularly to record that circumstance, while writing of the uses of the *London Catalogue*, because Dr. Boswell Syme assures me that he has never found the numbers to the names ' of the least use.' My own experience of them was, and still is, widely different indeed. I dislike much to receive a manuscript list of plants, or localities, in which the plant-names are not written in the same sequence and with the same numbers affixed, as seen in the *London Catalogue*. But a list of mere numbers *without names* has usually got thrown into the fire forthwith."

When Watson speaks here of the Society numbering 200 members, he would refer only to those who exchanged specimens. The actual number in 1850 was 255, the highest ever recorded. These were the palmy days of the Botanical Society of London, and it had every reason to look back on its growing years of existence with pride and satisfaction. In proof of this, evidently, the members had, in 1846, presented the President (still Dr Gray) and Watson with their portraits, and the

Secretary (Dennes) got his in the following year. The monthly minutes of these years recall many a well-known character. The Rev. C. A. Johns often figures as contributing west-of-England plants. In 1847 he added *Trifolium strictum* to the British Flora. He was then one of the assistant masters at Helston Grammar School (with Chadles Kingsley as botanical pupil) and writing his *Week at the Lizard.* (Have we not all smiled at the account of his hat, which covered, in one spot in the Caerthillian Valley, *Lotus hispidus*, *Trifolium Bocconi*, *Molinerii*, and *strictum* all growing together, and reflected that clerical head-gear was large in those days!) The evergreen *Flowers of the Field* first saw the light in 1853.

Miss Anna Worsley's name appears right from the beginning. She became Mrs. Russell and resided at Bristol, and Watson, who relied on her for Somerset and Gloucestershire plant-localities, wrote: "Our botanical correspondence and interchange of specimens have been carried on through a long series of years, and on my side with ever-increasing satisfaction." Bristol, then as now, possessed its special coterie of ardent botanists. Chief among them were Dr. Thwaites and Dr. Stephens. The former (Ph.D. and F.R.S., afterwards Superintendent of the Royal Botanic Gardens, Peradeniya, Ceylon, where he preceded Dr. Trimen) contributed in 1843 a paper on Bristol Mosses, enumerating 133 noteworthy species. He was the discoverer of *Epilobium lanceolatum* in Great Britain. Dr. Stephens, M.D., read several papers in 1845, '46, and '47 on the "Fungoid potato-murrain"—the dread spectre that haunted those terrible years of Irish famine. Later he announced his discovery at Clifton of *Allium sphærocephalum*, before known only in Jersey. Another sign of the times was the presentation in November 1, 1847, by Bloxam, of specimens of *Anacharis alsinastrum* (Bab.) discovered in a reservoir near Market Harborough by a Miss Kirby—this innocent record being followed by dire consequences as recorded in history.

These first British records are of special historic interest and the Reports are full of them. At the August meeting in 1844 John Tatham (chemist of Settle) and G. S. Gibson (an Essex banker, discoverer of *Galium Vaillantii* and author of the "Flora" of that county) presented specimens of *Arenaria uliginosa*, discovered by them, in company with the two James Backhouses, father and son, and Silvanus Thompson, near the top of Widdy Bank Fell in Upper Teesdale, and pronounced by Sir W. J. Hooker as a plant not previously found in the British Isles. G. Maw discovered *Lilium pyrenaicum* near South Malton, Daniel Oliver found *Naias flexilis* near Roundstone, Connemara, and Dennes collected *Leersia oryzoides* at Brockham Bridge, Surrey. The name of Gilbert Baker first appears in January 1852, discussing three species of Hieracia (*plumbeum*, *caesium* and *corymbosum*), not mentioned in the *London Catalogue* of that date, which he had found in Upper Teesdale.

Glancing through the annals of 20 years, how many familiar names catch the eye; names well known to those who search the Floras of the United Kingdom. From Ireland came many notes and specimens, mainly sent by Dr David Moore of the Glasnevin Botanic Gardens, Dublin; Richard Spruce, the famous Yorkshire bryologist, contributed northern mosses; Ralfs of Penzance, desmids; H. Bidwell made records from Shropshire, J. D. Salmon from Surrey. Alexander Irvine, Editor of the later volumes of *The Phytologist*, was a contributor from very early days; Edwin Queckett gave books to the Library. In the background—as ever—was the gentle presence of the Rev. W. W. Newbould, with how many another whom space does not admit of enumerating. A glorious band indeed, who have left their imperishable mark on British Botany for all time.

The end of the Society came gradually. Dr. Druce says: "The expenses of the rooms for the valuable Library and Herbarium in London, and of a paid Curator, were too great for the receipts, and slowly the Society fell into monetary troubles, so that in 1858 the books and plants had to be disposed of and the rooms closed, and the Society as such terminated." Nevertheless, like the Phœnix, it rose again, if in different guise, and the next chapter continues its story.

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JOHN GILBERT BAKER, F.R.S.

ANNALS OF THE B.E.C.

CHAPTER II: "RECOLLECTIONS OF THE THIRSK BOTANICAL SOCIETY."

T. J. FOGGITT.

"The Thirsk Natural History Society was founded in 1853 for the purpose of organising and developing the scientific exploration of the vicinity. The members meet once a month for consultation, discussion and the exhibition of specimens. The annual subscription is six shillings and the entrance fee five shillings. A manuscript note-book goes the round of the members once a month, in which from time to time they record their observations. The society possesses a tolerably good microscope and library of reference, but does not form any public collection of specimens. Mr. John G. Baker is the president."

This is an extract from a scarce and valuable book in my possession, *The Vale of Mowbray. A Historical and Topographical Account of Thirsk and its Neighbourhood*, by William Grainge. It was published in 1859, but even before it saw the light its information about the Natural History Society was badly out of date. For yet earlier records concerning it I turn to other and still more valuable works inherited from generations of botanical forebears—a number of volumes of *The Phytologist. A Popular Botanical Miscellany*, that most excellent monthly periodical which existed from June 1841 till some time in the '60's when it faded away, leaving a gap which, in my opinion, has never been so adequately filled since.

The first mention I can find of the Thirsk Society occurs in the spring of 1856 in a little article by J. G. Baker entitled "Periodic Phenomena of Vegetation in Thirsk, 1855" which begins "The spring of last year was so exceptionally late and inclement that the dates of the foliation and florescence of plants was retarded considerably beyond the usual time. The following lists are taken from a note book to which contributions were made by various members of our local Natural History Society"—obviously the manuscript notebook aforesaid. But very shortly afterwards the modest society began to enlarge its boundaries. *The Phytologist* for Dec. 1857 devotes two pages to recording the fifth Annual Meeting held on Nov. 2; for the members that day came to a momentous decision. We read: "The officers for the past year brought in their Reports, were thanked for their services and re-elected as follows:—President, Mr. J. G. Baker; Secretary, Mr. R. D. Carter" (I remember him well as Manager of the Thirsk Branch of Backhouse's Bank); "Librarian, Mr. J. J. Packer" (a stationer of the town who shortly afterwards married one of Baker's sisters); Mr Baker said that by reason of the sale of its herbaria and other causes the exchanges of British Plants which had been carried on for so many years with eminent utility by the London Botanical Society were at present suspended, and there was now no convenient centre to which contributors might send their duplicates to receive *desiderata* in return. He suggested that the Thirsk Society might profitably lend its endeavours to fill up the vacancy, and he volunteered to undertake the distribution of the flowering plants and Ferns. Mr J. H. Davies (a linen manufacturer then in business in the town who shortly afterwards migrated to Belfast and became a wealthy man and a well known Bryologist) "expressed his approbation of the idea and a wish that Mosses should be included in the scheme. After some discussion of details the resolutions were adopted unanimously."

Thus was an all-important milestone in the history of the B.E.C. reached and passed.

After that things began to hum. Reports of the proceedings were now regularly published. Henceforward every number of the Phytologist recorded the new members enrolled in the Botanical Exchange Club of the Thirsk Natural History Society. Many were members of the old London Botanical Society, others were new, and they hailed from all parts of the British Isles. H. C. Watson, author of *Topographical Botany*, joined the very first month; J. T. Syme (he had not yet adopted the Boswell) followed a month later. With them came Arthur Henfrey, now Professor of Botany at King's College, London, Dr J. Windsor, T. B. Flower, Thos. Moore, J. A. Brewer and J. D. Salmon. This last was just then completing a Flora of Surrey, but he died a few months later, and his friend Brewer brought out the book after his death. How strangely does history repeat itself! All these gentlemen wrote F.L.S. after their names, as did A. G. More, a rising young botanist, great friend of Gilbert Baker's, who became a frequent contributor, and later compiled, with Dr D. Moore, the *Cybele Hibernica*. Within a year the Exchange Club mustered 41 members; by 1861 there were 52, the highest number apparently recorded. Among them I note T. W. Gissing of Wakefield, J. Tatham of Settle, John Sim of Perth, E. J. Varenne of Kelvedon, Essex, and the Rev. W. H. Purchas who wrote the *Flora of Herefordshire*.

Of these early days of the Society I have no personal recollection, not being born (in Thirsk) until 1858. Nevertheless I was born into a botanical atmosphere. My father, William Foggitt, later F.L.S., came of a long line of dwellers in North Yorkshire who traced their origin to a certain Italian, from the town of Foggia on the Adriatic, who came over to Cleveland in the 16th century in connection with the alum industry. Family legend has it that he was excommunicated by the Pope for so doing, and made his forbidden passage concealed in a barrel. Be that as it may, the Foggitts have been hereditary chemists ever since, and therefore, almost inevitably, hereditary botanists. Dr. Druce himself is but one eminent example of how often the two pursuits go together. The combination can be traced in my own family for four or five generations at least, and, fortunately, shows every likelihood of being perpetuated in the future.

My father was a man of unusual parts. Of wide and varied learning, he read his Bible both in Greek and Hebrew, and could quote the Latin and English poets to any length. Without neglecting his prosperous business he yet had time for extensive literary labours; yet Botany was his absorbing hobby. From earliest youth he made wild-flower collections and notes, and I have in my possession a most elaborate book of local records to which I still frequently refer, and a Natural History diary extending over many years which I often think, if edited, might well prove a second "Natural History of Selborne," containing, as it does, not only notes on plants, but also on mosses, fungi, birds and insects, concerning which his interest and knowledge were almost equally wide and keen.

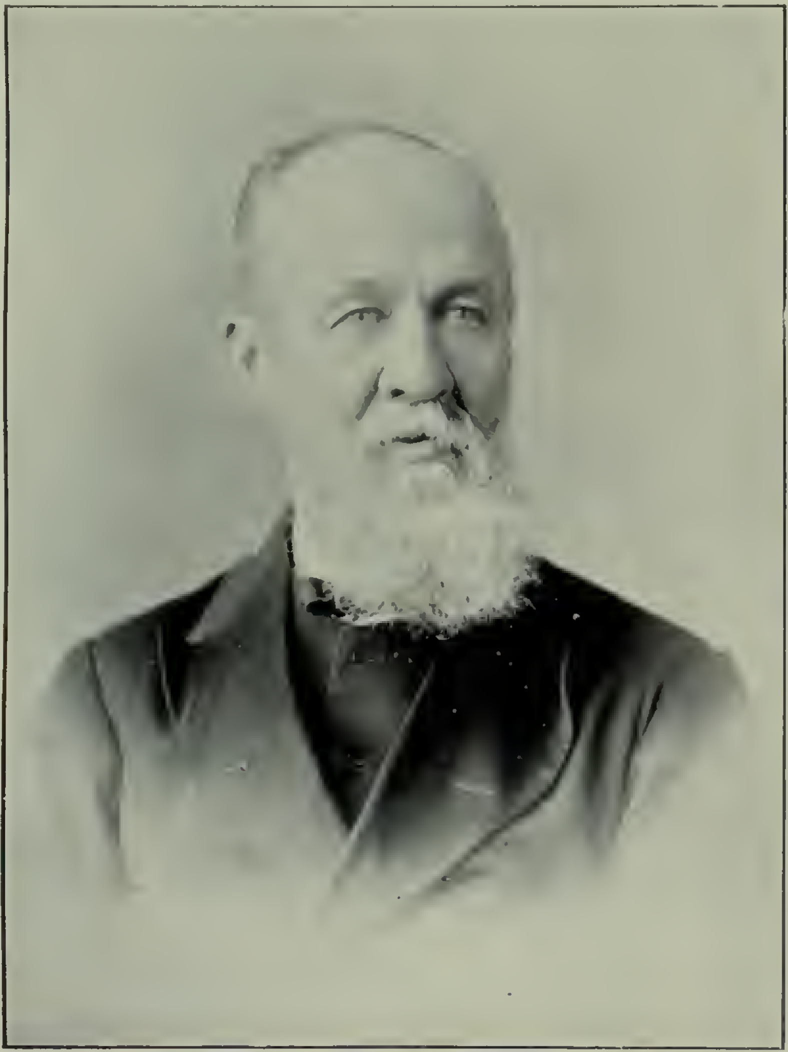
What must it have meant to such a youth to have, almost from earliest days, the companionship and closest friendship of such a congenial soul as John Gilbert Baker. About the same time that my grandfather, Thomas Jackson Foggitt, himself no mean botanist whose name occurs not infrequently in botanical annals, left his home in Yarm 20 miles away and set up business in Thirsk, the Bakers also migrated thither from Guisborough. They were, and are, Quakers of fine old Yorkshire dalesman stock, and John Baker, Gilbert's father, established a large general drapery and grocery business almost facing our own in the wide cobbled Market Square which is the pride of Thirsk. The business flourished exceedingly, but John Gilbert, the eldest son, a year older than my father, was never cut out for trade. A gentle, thoughtful student of nature from his boyhood, he loved better to roam the deep valleys and lofty limestone scars of the Hambleton Hills behind our little town, and spend long days tramping the incomparable moors and dales of our glorious North Riding.

It is not my task here to enumerate the labours and triumphs of this great botanist. I turn to my B.E.C. Report of 1920, 67 years after the founding of the little society in Thirsk, and read Dr. Druce's obituary of Dr. John Gilbert Baker, F.R.S., just dead in the 87th year of his age, and see him described as "one of the greatest of British systematists" with a list of honours and a record of botanical works that occupy several pages even to enumerate, and I am proud that my very earliest recollections are of so great a man.

As children, youths in their teens and in their earliest twenties, Gilbert Baker and my father must have tramped together over practically the whole of the North Riding collecting the botanical records that Baker so soon made use of. One of the earliest results was a supplement to Baines' *Flora of Yorkshire* which had appeared 16 years previously. John Nowell contributed the Mosses, but Baker was responsible for the flowering plants and ferns, and much information regarding their surroundings. On the fly-leaf of my copy of this work is the inscription "To William Foggitt, his companion on many an excursion, the scientific results of which are here appended, from his sincere friend John G. Baker, Thirsk 23.12.54." He was therefore barely 21 when this book appeared. Another work of these early days appears in Grainge's *Vale of Mowbray*, already referred to—a most exhaustive, admirable and beautifully written "Outline of the Physical History of the District, comprising its Geology, Mineralogy, Palæontology, Physical Geography, Botany, Zoology and Climatology." The very existence of this paper may now be forgotten, since Dr. Druce makes no mention of it in his list of Baker's early works; but how full and careful were its records is evidenced from a list of no less than 18 willows enumerated as growing along the mile of winding river bank where the little Codbeck flows from South Kilvington to Thirsk, namely *Salices pentandra, fragilis, Russelliana, decipiens, alba, undulata, triandra, Helix, rubra, Forbyana, viminalis, Smithiana, rugosa, ferruginea, cinerea, aquatica, oleifolia* and *Caprea*. Of these "the greater part remain unto this present, but some are fallen." Undoubtedly this stretch of stream is unusually beloved of the willows, but the extent of the list is certainly largely due to the care and skill which this difficult family had there received.

The activities of the Natural History Society and its members are further evidenced by the many references to Thirsk to be found in Syme's Edition of *Sowerby's English Botany*. To give only one instance—the plate and description of var. *complanatum* of *Allium oleraceum* were taken from the very plants whose livid olive umbels and thick, nearly flat leaves still flourish in abundance in a hedge but a few hundred yards from my house. The partnership of the two leading members can be seen in the *London Catalogue*, and in many a Herbarium—"*Ranunculus pseudo-fluitans*—Baker and Foggitt." This plant I believe they discovered in the Swale, where I see my father was also the first to make a North Yorkshire record of *Potamogeton flabellatus*, there still abounding.

In truth it was a wonderful flora that lay stretched around for a botanist's inspection. Chief of its rarities, perhaps, might be considered *Scheuchzeria palustris*, then fairly plentiful in Leckby "Carr" (this is a local name for a bog) some six miles from Thirsk. It was first discovered there in 1787 by the Rev. James Dalton, a famous Yorkshire botanist of his day, from whom his godson, Sir Joseph Dalton Hooker, derived his second name. Baker describes it as still to be found in the peat bogs of the swampy parts of the marsh seventy years later. But that was the end of it. Shortly after, drainage operations were begun and the *Scheuchzeria* vanished. Many a time, as a tiny child, have I been with my father to the bog in a vain search, which I later continued for my own lists and collections which I began, I remember, before I was nine. Later, when I seriously embarked on the Herbarium which has been my life's hobby, I went further afield to find the plant I had just missed at home. I visited the localities given in Sowerby, Bomere Pool near Shrewsbury where I was told (let us hope it was not true) that a Welsh botanist had just taken the last bit. A similar story was related of Wybunbury Bog, Cheshire; so finally I went to Methven Bog, Perth, its last stronghold, where John Sim used to record it in great abundance. (In fact he offered,



WILLIAM FOGGITT, F.L.S.

[illegible]

in *The Phytologist*, to exchange specimens of it for *Cypripedium*, I wonder with what result). But there a most extraordinary fate had recently overtaken it. I have just come across this newspaper cutting dated January 1889—"Nowhere in Scotland, except in the Bog of Methven, did that rare plant *Scheuchzeria palustris* grow. But now and for the time to come they will look in vain for it even in the Bog of Methven. For Professor Hillhouse reports that 300 or 400 black gulls, settling in the bog, have devoured everything in the shape of vegetation including the rare plant." After that, for many years the plant was considered extinct, until its recent discovery on Rannoch Moor, Perthshire, where I have frequently seen it, and where, only a few months ago, a friend counted about 80 flowering spikes.

Then there was the yet more elusive *Cypripedium*; but I cannot be sure that Gilbert Baker ever saw a growing, flowering specimen, and I know that my father did not, though once I succeeded in showing him the leaves, in Wharfedale. Like a will-'o-the-wisp it floats before the botanist—picked by some school-child who cannot identify the place, or known to someone who, wisely, refuses to divulge the secret. After all these years I still live and hope.

But *Actaea* was there for them, *Cephalanthera ensifolia*, *Ribes alpinum*, *Carex digitata*, *Hieracium prenanthoides*, *Festuca sylvatica*, *Lysimachia thyrsiflora*, *Allium Scorodoprasum*, *Drosera anglica*, *Trientalis*, *Potentilla verna*, *Salix nigricans*. All these and how many others. *Gagea* grew by the stream sides, *Orchis ustulata* in the meadows, valleys were purple with *Aquilegia*, fields golden with *Trollius*, hill sides starred with *Primula farinosa* and woods were blue with *Myosotis sylvatica* and fragrant with beds of *Convallaria*.

And they yet remain. Certainly one has to go further and further into the wilds for them in these days when—literally—thousands of trippers, brought by char-a-bancs from great industrial towns, swoop down the Farndale valley in daffodil-time like a swarm of locusts, leaving a similar trail behind. Also the increased cleanliness of the farmers' seeds has done away with certain aliens, like *Alyssum calycinum*, that used to be frequent in our fields. (I was glad to see *Delphinium Ajacis* here last summer). But with wonderfully few exceptions I can still lay my hands on the plants that were listed in the early records of the Thirsk Society, even if I have to hunt rather long for them. Almost the only disappearance for which I can in no way account is *Equisetum hyemale* from a ditch that has no appearance of having changed its character. I have noticed this same disappearance in other parts of the country. Is this by chance a disappearing species?

But the circumstances have changed indeed. In the days when Baker and Foggitt tramped the North Riding there were no motor cars; there were only very few trains; with a few exceptions the roads were execrable and Sutton Bank, our famous hill, a nightmare. Inns, too, were of the homeliest character and very few and far between. Stout limbs and stout hearts were needed by the field botanists who left the beaten tracks That such were possessed by these two young men the following incidents, which I have often heard my father relate, will evidence.

Baker and Foggitt were kept by their respective fathers with their noses pretty hard to the business grindstones, especially the former. So that when one summer's day they begged the day off for a botanising expedition on the Hambletons, Baker *père* said "Yes, Gilbert, thou can go, but I wish thou would collect the money for an account owing at Silton." (a tiny village about 7 miles N.E. of Thirsk and almost in the opposite direction they wished to take). "It will not be much out of our way," agreed the dutiful Gilbert. So to Silton they went, and walked on to Hawnby, another six miles. This is a good botanical district, and better still is Rievaulx, four miles further, where in the woods and by the river Rye they lingered long; and then by Helmsley, three miles, Kirkby Moorside, another six, and at least three miles further they reached Farndale where again they botanised until the summer night was upon them.

Their intention had been to catch the last train home from Hovingham a good six miles away; but no ardent botanist will be surprised to hear that on arrival at the station they found the train had gone. They were pretty tired by then and Baker announced his intention of walking on (6 miles) to Malton and spending the night with a relative there. He advised my father to do the same but the latter refused. "No, Gilbert. I must get home to-night. They are expecting me," and resolutely he set off on his 14 mile tramp to Thirsk. And he got within five miles of it, and then, utterly exhausted and benighted, he lost his way. Seeing a light yet burning in a farmhouse window he called there to inquire the road. Fortunately the good man recognised him and insisted on bringing him in to rest and partake of coffee and cold pie. But when my father tried to get up after his meal he was unable to stand from fatigue; so perforce he spent the night with his hospitable friends, walking into Thirsk next morning some time before Baker arrived there by train. This was, he used to say, the longest walk he ever took, for the mere distance by road was a good 40 miles (with some tremendous hills in them), quite irrespective of all the botanising *en route*.

And when their brief holidays came they wandered afield. One summer they had arranged to spend the inside of a week with John Garbutt, a well known dalesman of Snilesworth, a most remote spot among the moors at the N.E. end of the Hambleton Hills, below Slapestones, where was—and is—the famous Chequers Inn where, it is claimed, the peat fire on the hearth has never been out for a hundred years. They walked there by Sutton Bank, Rievaulx and Hawnby, and when about two miles from the farm found themselves utterly benighted, having botanised, as usual, too long in the fascinating Rievaulx woods. Long they wandered in the darkness, tumbling over the giant ant-heaps which there abound, and whose presence (with their inmates) made them unwilling to sleep out that summer night as at one time seemed inevitable.

But at last a light led them to a farm where the old farmer and his wife, not yet gone to bed, knew them at once—for did they not make the long day's excursion in their farm cart every Monday to Thirsk Market with their butter and eggs—and hailed them rapturously. And when they sought directions for Lockyer Farm the farmer exclaimed " Why, I'll get our David and William to show you. They have to go to school there in the morning, and they can sleep with John Garbutt's boys. They've gone to bed now, but we'll soon rouse 'em." My father and Baker protested at this heartless conduct but their friend would take no denial. " Nay, t'will only be getting 'em up a bit earlier. Now Mary you get hold of their heads and I'll take their feet, and we'll soon wake 'em." So the parents disappeared up the staircase, and there followed one heavy thump on the floor and then another, and soon the poor lads, all dazed and half awake, appeared, rubbing their eyes, and with a lantern led the way to Garbutt's house. This remote farm I know well, with its wonderfully large juniper trees, one, from its age known as " Old Adam," growing beside it. Here among the wild moors and deep valleys, or in beautiful Bilsdale where stands the noted hostelry of " Chop Gate," locally known as " Chop Yat," the friends botanised so enthusiastically that Baker went through his boots and was fain to call at an old cobbler's at Laddle Ghyll near Hawnby before his return. Said Baker " Thou must guarantee them to turn water." The old man looked at him over the top of his spectacles, " Nay, nay Mr. Baker, I'll guarantee 'em to turn gravel and small steeans but watter is a parlous thing."

Needless to say the pair found their way often to that botanical paradise, Upper Teesdale, the glories of which had recently been explored by Babington and his great friend, James Backhouse. Charles Babington, I may here mention, visited Thirsk in 1861, staying with the Rev. W. T. Kingsley—cousin of Charles Kingsley—at South Kilvington Rectory. In his diary he records how he spent the evening with Baker, looking over his Rubi. He met my father also but if, as was possible, I too saw the great man I was too young to remember it, though Mrs. Babington I later knew well. The Rector of Kilvington (he held the living for 57 years, dying at the age of 101) would doubtless have been a member of the Thirsk Natural History Society, for he was a fair botanist as well as an enthusiastic gardener. Outside his Rectory was the notice, which I myself remember, " Trespassers Beware! Polypodiums and Scolopendriums set in these Grounds."

To return to Upper Teesdale. It was a day's march to get there from Thirsk, for the railway then went no nearer than Barnard Castle, from whence Baker and Foggitt would walk, close on twenty miles, through Middleton-in-Teesdale, to the happy hunting grounds of Widdy Bank, Cronkley and Mickle Fell. On one occasion they were benighted on Malden Fell beyond Cauldron Snout, and with much difficulty in that wild country made their way at last to the inn at Langdon Beck—not the little hotel we now know so well and which was not then built, but the long, low white building, now the stables, on the other side of the road. Mr and Mrs Barker, grandparents of the proprietor who died suddenly three years ago to the great regret of so many of us, had gone to bed, but Mrs. Barker put her head out of the window and recognised the two youths at once. " Why, my bairns, is that you? I'll come downstairs and let you in." Truly there was an archaic charm about botanising in Teesdale 80 years ago, before the days of petrol pumps and a boy in buttons at the High Force Hotel.

The fruit of all these labours—Baker's *Flora of North Yorkshire* (with my father's name on so many pages) was published by Longmans (but printed at Thirsk) and appeared late in 1863. By this time my father was married some years (he married at 22) and Baker had lately followed his example. A few copies of the Flora had been sent to friends and subscribers and the rest of the edition was still in Baker's house over the shop premises in the market place, which Gilbert, his wife and recently born son Edmund now had to themselves, his parents having moved a few doors away. What followed is very vividly impressed on my recollection.

On the night of the 9th of May 1864 I was sleeping, for some reason, at the house of my grandfather in an adjoining part of the town, when we were roused up at two o'clock in the morning by the thrilling tidings that the Baker premises were on fire. My uncle—a student then at home on vacation—immediately dashed to the scene, and, to my everlasting gratitude then and ever after, took me with him, I being then six years old, and deposited me at my parents' house where from the windows I could look across the corner of the square at the blazing pile. No wonder the scene is burned into my remembrance, as vivid now as it was then, near 70 years ago. The whole large block of buildings a mass of flames; the crowd in the market place; the string of buckets passed by hand from the mill-dam over 200 yards away. This most energetic performance was about as much use as a child's squirt would have been. The town fire-engine, a real museum piece, had given up the ghost early in the day—or night—and the fire engines summoned from York and Darlington, each about 24 miles away, naturally arrived far too late. Imagine the effect on a little boy's mind. One moment I could see through the reddened windows the familiar chairs and furniture of the up-stairs drawing-room I knew so well; the next they had disappeared into the inferno as the floor gave way. The fire spread upwards from the basement, started, it was supposed, by a match dropped down the cellar grating by some smoker returning late from a dance held in the town that night.

Gilbert Baker and his family had the narrowest of escapes. Really they owed their lives to the infant Edmund, who had roused his mother in the middle of the night. She smelled burning and made her husband open the door—to be greeted by a burst of flames. In their night gear, with the utmost difficulty and not an instant too soon, they made their way down the narrow burning staircase, Gilbert holding his son, his wife, poor woman, clasping a bedroom candlestick instead of the gold watch she imagined she was saving. I remember my father making (to my mother's great alarm) the most daring attempts to rescue belongings from the burning house, and it was only natural that armfuls of botanical specimens were what he succeeded in carrying forth. Baker was especially distressed because a collection by the elder Backhouse happened to be in his possession at the time. In this connection a letter which I have just come across in the third volume of Seeman's *Journal of Botany* may here be quoted. "With regard to the specimen (from this collection) referred to as having been burnt, I now find it to be amongst a few things rescued when my house fell down, by Mr Foggitt. T. G. Baker, Thirsk, May 10, 1865."

All else was lost in that terrible catastrophe; house and shop and contents; all Gilbert's botanical library and notes and collections, the newly printed Flora, the tolerable microscope, the manuscript notebook and all the Reports and records of the Natural History Society. The damage amounted to £10,000, scarcely a tenth of which was insured, but in such esteem was Gilbert Baker held that his fellow botanists collected and presented him with a handsome sum to replace his books. (The Secretary for the subscription list was J. T. Boswell Syme, and Edward Newman Newbould and H. C. Watson were on the Committee). The premises were rebuilt, but old John Baker never really recovered the shock of the fire and died two or three years later. The sons carried on the business, but Gilbert, whose heart had never been in it, became now thoroughly unsettled and began turning his attention elsewhere for a career more suited to his genius. My father became the Curator of the Exchange Club for the next two years, and in his Report I notice one especially interesting record of a specimen sent by A. G. More of the Irish orchid *Neotinea intacta*, just discovered by his sister at Castle Taylor, Co. Galway; an event which caused quite a stir in the botanical world. By the following year Gilbert Baker had begun his botanical career in earnest, and with his family had removed to 25 Sidney Villas, Richmond, Surrey, and henceforward, from February 1867, the Reports were published in London and connection with Thirsk had come to an end.

THE PIONEER WORK OF THE SYSTEMATIST.

(Brief notes from the Presidential Address of the Rt. Hon. Lord Rothschild, F.R.S., to the Zoology Section of the British Association at York on September 1, 1932).

At the time of Linnaeus systematics were in their infancy and specimens showing marked differences were usually considered to represent distinct species, each of which was constant. Experience has since proved that similarity does not necessarily imply relationship and, on the other hand that dissimilarity is not of necessity evidence of specific distinctness. Variability abounds in every species and in every organ, and if these proved facts are borne in mind by systematists the reproach of superficiality often levelled at their work can be borne with equanimity. Variability is an essential character of every living thing. The former erroneous idea of the constant species has given way to the conception of a flexible species. The saying that "like breeds like" requires to be modified into "a population breeds a population with the same extent of variability."

The systematist renders service in two entirely different directions. Being alone able to identify the species in the critical group in which he has specialised, he is able to assist biology in its work of safeguarding humanity against organisms which are harmful to health or destructive to food. Applied biology can only be a science if founded on accurate systematics. The help which the systematist is able to render to applied biology is for him only a side-issue. He is a student of pure science, spending his time in the possible discovery of new species or of new relations between those already known, and endeavouring to ascertain new facts as to the relation between a species and its environment—the driving force in this pursuit of knowledge being the irresistible attraction it has for him The describing of new species and fitting them into a given scheme of classification may seem work of an elementary character, useful and indeed necessary but nevertheless only preliminary. Any natural classification must also embrace an enquiry into the evolution of the species concerned. The study of any species of which he possesses ample and adequate material enables the systematist to ascertain the extent and kind of its variations and to compare notes with the biologist whose study of the flexibility of the species has been for the purpose of finding out whether its variations are purely accidental or whether there is underlying system behind them. Many so-called "laws of development" have resulted from such enquiries. In the experience of the systematist such laws are "rules with exceptions," and it may be stated in general that "the opposite must always be expected to occur." Exceptions are always of great interest and value, and it is therefore the duty of the systematist who discovers an exception—generally accidentally—fully to record it. Systematics and morphology are different expressions for the same kind of research, and I have no doubt that experimental biology will have such a deepening influence on systematics that the superficial gap between these two lines of investigation will disappear also. "Knowledge *begins* with the observation of phenomena, not with the experiment."

Systematics are not only concerned with the study of species and their variations. Species have to be grouped into genera according to their relationship, that is according to their descent. So the systematist must study plant-geography for past connections between genera and species. If he can prove that two genera or species now widely separated geographically are really of common stock, then in former times there must have been a means of communication between them. As an illustration of this Lord Rothschild mentioned two closely-related genera of fleas only found in South America and Australia, and said that the assumption that there was at one time a connection between South America and Australia was the only explanation at all satisfactory. (For botanical evidence of the same character members should consult H. N. Ridley's "Dispersal of Plants.") Finally, Lord Rothschild emphasised the fact—well known to all critical botanists—that there were so many questions which could only be answered by the study of extensive systematic collections that we were bound to collect all the evidence possible.

PLANT NOMENCLATURE.

T. A. Sprague, D.Sc., F.L.S.,
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The neglect of plant nomenclature in the past made it necessary for the International Botanical Congress held at Vienna in 1905 to establish an elaborate set of International Rules of Botanical Nomenclature, consisting of 58 Articles and 37 Recommendations, designed to bring order out of confusion. Articles 1-18 contained the general *principles* on which the remainder of the International Rules was based. Art. 19-58 were the *rules* by which nomenclature is governed: they are applied retroactively, so that any name or form of nomenclature contrary to a *rule* must be *rejected*, however long it has been established (unless it is a generic name *conserved* under the provisions of Art. 20, or a family name *conserved* under Art. 22). The *recommendations* deal with points of minor importance, and there is no penalty for their non-observance: a name may *not* be rejected merely because it is contrary to a recommendation. A second edition of the International Rules was issued in 1912, embodying additions and amendments introduced by the Congress held at Brussels in 1910. A few important changes were made at the International Botanical Congress, Cambridge (1930), and the text of the Rules was re-arranged and thoroughly revised with a view to making them easier to consult and to removing possible sources of ambiguity. The responsibility for preparing the third edition of the International Rules was assigned to an Editorial Committee, consisting of the late Dr J. Briquet, Prof. H. Harms, Prof. L. Mangin, and Dr A. B. Rendle. Owing to the lamented death of Dr Briquet, the preparation of the new edition has been unavoidably delayed, but is now understood to be approaching completion. In view of this delay the writer was requested by the Editor to supply an account of the chief provisions of the Rules, as amended at Cambridge, illustrated by examples drawn as far as possible from the British flora.

§ 1. Taxonomy and Nomenclature.

The function of rules of nomenclature is to indicate the correct name of any taxonomic (systematic) group, *after* the limits of that group have been defined by the taxonomist (systematist) and a list of all the names that have been applied to the group has been drawn up. As the word " group," employed in the International Rules, is sometimes misunderstood, it may be well to define it. Any set of plants recognized in a taxonomic classification is a " taxonomic group " (or " group," for short). The following are examples:—*Ranunculus acris*, forma *tomophyllus* (Jord.) Drabble et Long; *Clematis Vitalba*, var. *Timbali* Drabble; *Cochlearia danica* L., *Barbarea* L., *Caryophyllaceae*, *Gamopetalae*, *Dicotyledoneae*, *Gymnospermae*, *Spermatophyta*. The examples cited belong to nine different categories, from "form" upwards. The names of the principal categories of taxonomic groups recognized under the International Rules are the following: form, variety, species, section, genus, tribe, family, order, class, division. Additional categories such as sub-species, sub-genus, sub-family, etc., may be intercalated below species, genus, family, etc., respectively. Each of the categories recognized belongs to a different *rank* from the others.

§ 2. SCIENTIFIC NAMES OF PLANTS: SPELLING AND GENDER.

Scientific names of all groups are usually taken from Latin or Greek, *e.g.*, the generic names *Arenaria* and *Polycarpon*. When taken from any other language, they are treated as if they were Latin words: for example the Provençal name amelancher or amelanchier (masc.), adopted as a generic name by Medikus in 1789, is treated as a Latin word *Amelanchier* (fem.).

The original *spelling* of a scientific name (*i.e.*, the spelling in the place of valid publication) must be retained unless it can be shown that there was a typographic error (misprint) or an unintentional orthographic error (*lapsus calami*) on the part of the author. Linnaeus deliberately adopted the spelling *Amaranthus*, and that spelling must accordingly be retained, although the correct classical form is *Amarantus*. Similarly he deliberately chose the mediaeval spelling "*sylvatica*" instead of the classical "*silvatica*": hence we must write *Fagus sylvatica* and *Stachys sylvatica*, although the spelling *silvatica* is intrinsically preferable, and is the form actually recommended for adoption in the case of *new names*. On the other hand, the scientific name of the Caper Spurge is *Euphorbia Lathyris*, not *E. Lathyrus*. By some oversight on the part of Linnaeus, the specific epithet *Lathyris*, as well as the synonyms *Lathyris major* Bauh. and *Lathyris* Cam., all appeared in Species Plantarum, ed. 1, with the spelling "*Lathyrus*." These obvious misprints were duly corrected by him in Sp. Pl., ed. 2.

The *gender* of generic names is determined as follows:—

I. A Greek or Latin word adopted as a generic name takes the gender given by the author who published it. Examples: *Orchis* L. (f.), *Stachys* L. (f.), *Tragopogon* L. (n.). According to classical usage, *Orchis*, *Stachys* and *Tragopogon* should be masculine, but the genders assigned by Linnaeus in 1753 to these generic names must be accepted.

II. A modern compound formed from two or more Greek or Latin words and used as a generic name takes the gender of the last word. Thus *Aceras* R. Br. is neuter because the second word (ceras) of which it is composed is neuter in Greek. The fact that Robert Brown treated the generic name as feminine is immaterial.

III. An arbitrarily formed generic name, or a vernacular name used as a generic name, takes the gender assigned to it by its author.

Where an author in cases I or III has failed to indicate the gender of a generic name, the next subsequent author has the right of choice.

The name of the tapioca and cassava genus, *Manihot*, was published without indication of gender by Boehmer in 1760. It is feminine because Crantz (1766), who was the first author (from 1753 onwards) to supply specific epithets, proposed the feminine names *Manihot gossypifolia*, *moluccana*, *esculenta*, etc.

As is well known, a specific epithet (when it is an adjective) must agree in gender with the generic name to which it is attached. Epithets of varieties and forms also agree with the generic name, *e.g.*, *Scirpus Tabernaemontani*, var. *capitatus* Hausskn. (not var. *capitata*, agreeing with the word "varietas").

§ 3. FORMS OF NOMENCLATURE USED FOR THE DIFFERENT CATEGORIES OF TAXONOMIC GROUPS.

For purposes of nomenclature, the species is taken as the unit: groups below the rank of species bear the name of the species as well as their own distinctive epithet. The name of a species is composed of two separate words (simple or compound), the first being the *generic name*, the second the *specific epithet*. Specific epithets composed of two separate words are contrary to the Rules. Such words must be combined, with or without a hyphen. The specific epithet may be an adjective, *e.g.*, *Crambe maritima* L., *Malva sylvestris* L., *Cardamine hirsuta* L., and *Viola Riviniana* Reichb., or a substantive in apposition, *e.g.*, *Saponaria Vaccaria* L. and *Schinus molle* L., or a substantive in the genitive case, *e.g.*, *Sagina Reuteri* Boiss., *Aster novae-angliae* L. It will be observed that some of the above specific epithets are spelt with a capital and others with a small initial letter. There is no *rule* dealing with this question of capitals in specific epithets, but for the sake of uniformity, botanists are *recommended* to employ a capital initial letter for a specific epithet when it is either a personal name, *e.g.*, *Riviniana*, *Reuteri*, or a generic name (or former generic name), *e.g.*, *Vaccaria*. All other kinds of epithets take a small initial letter, *e.g.*, the vernacular name *molle* (in *Schinus molle*), the geographical name *novae-angliae*, and descriptive adjectives such as *maritima*, *sylvestris* and *hirsuta*.

Names of subdivisions of species are formed by adding the category and distinctive epithet of the subdivision to the binary name of the species, *e.g.*, *Malva pusilla* Sm., var. *lasiocarpa* C. E. Salmon. It is not sufficient to add merely the subdivisional epithet, *e.g.*, *Malva pusilla lasiocarpa*, since that method of citation leaves the category of the subdivision *lasiocarpa* in doubt.

Names of sub-genera and sections are usually substantives resembling the names of genera. Names of subsections and other lower subdivisions of genera are preferably adjectives in the plural number and written with a capital initial letter: they should agree in gender with the generic name (not with the word "species" understood). This latter point, however, is not dealt with in the Rules. Examples: *Fraxinaster*, *Archieracium*, *Heterodraba*, *Stachyotypus*; *Fimbriati*, *Bibracteolata*, *Pachycladae*. Since the same subdivisional name may be used in more than one genus, it is necessary in full citations to give the name of the genus as well as the category and name of the subdivision.

Names of genera are substantives (or adjectives used as substantives) in the nominative singular and written with a capital initial letter. They may be taken from any source whatever, and may even be composed in an absolutely arbitrary manner. Botanists are recommended not to adopt adjectives as new generic names, but if such names have once been validly published they cannot be rejected on the ground that they are adjectival in form.

Names of families are formed from the name (or former name) of one of their constituent genera by adding the suffix *-aceae* to its *stem*. Thus from the generic name *Portulac-a* we get the family name *Portulacaceae* (not *Portulaceae*). An exception is made for eight very well known family names which do not end in *-aceae*. These are *Palmae*, *Gramineae*, *Cruciferae*, *Leguminosae*, *Guttiferae*, *Umbelliferae*, *Labiatae*, *Compositae*. At Cambridge in 1930, in order to meet a desire for uniformity of termination, it was agreed that those botanists who preferred to do so, should be entitled to use, as alternatives, the appropriate names formed from the stem of a generic name with the suffix *-aceae*, *e.g.*, *Brassicaceae* instead of *Cruciferae*. It was also agreed that those botanists who treat the *Papilionaceae* as a separate family should be entitled to adopt that name, although it is not formed in the prescribed manner from a generic name, but is merely descriptive.

Names of sub-families are taken from the name of one of their constituent genera with the ending *-oideae*, *e.g.*, sub-fam. *Rumicoideae* from the generic name *Rumex*, *Rumic-is*. Similarly those of tribes have the ending *-eae*, *e.g.*, tribe *Brassiceae*; and sub-tribes the ending *-inae*, *e.g.*, sub-tribe *Anemoninae*.

§ 4. Valid Publication.

Names that are not validly published have no status under the Rules, and have no claim to recognition by botanists. Publication of scientific names of plants is effected by sale to the general public of printed matter or " indelible autographs " (*i.e.*, indelible reproductions of handwriting such as Wallich's Catalogue). General distribution of a work among representative botanical institutions also effects publication. In order to secure recognition, however, a name of a taxonomic group must not only be effectively published, but must be accompanied by a *description* of the group, or by a reference to a previously and effectively published description of it. The name *Statice transwalliana* Pugsley was validly published in *Journ. Bot.*, 1924, 133, since it was printed, with a description, in a work placed on sale to the general public. The name *Limonium transwallianum* was validly published by Pugsley in *Journ. Bot.*, 1924, 277, since it was printed with a reference to the previously and effectively published description on p. 133.

A name may be validated by a reference to a pre-Linnean description. Thus the name *Plumbago indica* L. in Stickman, *Herb. Amboin.*, 24 (1754), although published without a description, was validated by a reference to the description of *Radix vesicatoria* Rumph., *Herb. Amboin.*, v, 453, t. 168 (1750). It antedates and accordingly replaces the well-known name *P. rosea* L. (1762). Similarly, a name may be validated by a reference to a description published by an author who did not accept the Linnean binary system of nomenclature. Thus the name *Juncus alpino-articulatus* Chaix in *Vill. Hist. Pl. Dauph.*, i, 378 (1786), was validated by a reference to the description of *Juncus foliis fistulosis, articulatis, panicula simplici, glumis aristatis* Haller, *Hist.*, ii, 170 (1768). It was *not* a nomen nudum.

From 1932 onwards, names of new groups are not validly published unless they are accompanied by Latin diagnoses.

A name of a taxonomic group is not validly published when it is merely cited as a synonym.

§ 5. LEGITIMATE AND ILLEGITIMATE NAMES.

Names (or forms of nomenclature) in accordance with the Rules are said to be *legitimate*. Those that are contrary to the Rules are *illegitimate* and must be rejected. Examples of *illegitimate forms of nomenclature* are names of species consisting of a single word, such as *Phaeocephalum* Ehrh., which is a synonym of *Schoenus fuscus* L.; names of species consisting of three or more separate words, *e.g.*, *Apocynum foliis Androsaemi* L., *Sp. Pl.*, 213 (1753), which was replaced by the legitimately formed name *Apocynum androsaemifolium* L., *Syst.*, ed. 10, 946 (1759); names of genera composed of two or more separate (and unhyphened) words, *e.g.*, *Uva Ursi* Mill., *Gard. Dict. Abridg.*, ed. 4 (1754), which was replaced by *Arctostaphylos* Adans. (1763); names of subspecies, varieties, forms, etc., which are binary combinations, *e.g.*, " var. *Ranunculus Boraeanus* Jord." instead of *Ranunculus acris*, var. *Boraeanus* (Jord.).

A name is illegitimate in the following cases:—

(1) If it was superfluous when published, that is, if there was already a valid name for the group to which it was applied. *Vaccinium montanum* Salisb., *Prodr.* 291 (1796), is illegitimate, being a superfluous name for *Vaccinium Myrtillus* L. (1753).

(2) (In species and subdivisions of species) If it was a new name or combination in which the earliest legitimate epithet available was not adopted (see § 7). *Potentilla Tormentilla* Neck. (1770) is illegitimate, because Necker did not adopt the earliest legitimate epithet available, namely *erecta*, when he transferred *Tormentilla erecta* L. (1753) to *Potentilla*.

(3) If it is a later homonym (see § 14).

Generic names are illegitimate in the following special cases:—

(1) When they coincide with a technical term currently used in morphology, unless they were accompanied, when originally published, by binary specific names. For example, the generic name *Radicula* Hill (1756) coincides with the morphological term " radicula " (radicle), and must be rejected, since it was not accompanied by binary specific names.

On the other hand *Tuber* Micheli ex Fries (1823), which coincides with the morphological term "tuber," was accompanied by binary specific names, *e.g.*, *Tuber cibarium*, and is therefore admissible.

(2) When they were single words used to designate species, *e.g.*, *Phaeocephalum* Ehrh. (name for *Schoenus fuscus* L.).

(3) When they consist of two (or more) words, unless these words were from the first combined into one, or joined by a hyphen, *e.g.*, *Uva Ursi* Mill. (see above).

Specific epithets are illegitimate in the following special cases:—

(1) When they exactly repeat the generic name, with or without the addition of a transcribed symbol, *e.g.*, *Linaria Linaria*, *Nasturtium Nasturtium-aquaticum.*

(2) When they were published in works in which the Linnean system of binary nomenclature for species was not consistently employed.

Tussilago vulgaris Hill, *Brit. Herbal*, 446 (1756), and all other binary names of species proposed by Hill in the same work, are illegitimate because Hill did not consistently adopt binary names for species: his second species of *Tussilago*, for example, was "*Tussilago Alpina purpurea.*" Incidentally, *Tussilago vulgaris* Hill would in any case be illegitimate, since it was a superfluous name for *Tussilago Farfara* L. (1753).

§ 6. CITATION OF AUTHORS' NAMES FOR PURPOSES OF PRECISION.

In order to indicate the name of a taxonomic group accurately and completely, and to give a clue to the approximate date of its publication, it is necessary to cite the author who first published the name concerned. Examples: *Onagraceae* Lindl.; *Epilobium* L.; *Epilobium hirsutum* L., var. *villosissimum* Koch; *E. parviflorum* Schreb., var. *mollissimum* A. Léveillé.

An alteration of the diagnostic characters or of the limits of a group does not warrant the citation of an author other than the one who first published the name. When the changes have been considerable, however, an indication of their nature, and of the author responsible for the change, is added. Examples: *Phyllanthus* L. em. Müll.-Arg.; *Myosotis* L. pro parte, R. Br.

When a group below the rank of genus is transferred, retaining its name or epithet, to another genus or species, where it retains the same rank, or when the rank of a group is altered, the original author must be cited in round brackets followed by the name of the author responsible for the change. Examples: *Sorbus* sect. *Aria* Pers., on transference to *Pyrus*, becomes *Pyrus* sect. *Aria* (Pers.) DC.; *Cheiranthus tristis* L. on transference to *Matthiola* becomes *Matthiola tristis* (L.) R. Br.; *Medicago polymorpha* L., var. *orbicularis* L., when raised to specific rank, becomes *Medicago orbicularis* (L.) All.

It is very important to cite the name of the original author, since the type adopted or described by the original author remains the type of the new combination, even if the author of the latter has misidentified the group concerned (see § 9).

§ 7. ONLY ONE VALID NAME FOR EACH GROUP.

Each taxonomic group, *with given limits, position, and rank,* can bear only one valid name, the *earliest* one that is in accordance with the Rules of Nomenclature. The only exceptions are the eight names of families not ending in *-aceae,* for which *alternative* names ending in *-aceae* may now be used, and the name *Papilionaceae,* which may be used as a family name instead of the appropriate one formed from a generic name (see § 3). [illegible]

Of course if the *limits* of a group are altered so as to exclude certain elements or to include other elements, it may be necessary to change its name, but in that case the group itself has been changed. Similarly, if the *position* or *rank* of a group is changed, its name may have to be changed also: thus a new name is obviously required when a species is transferred from one genus to another, or when a variety is raised to the rank of species.

In order to find out the valid name of a particular group, all the names which have been given to it are placed in chronological order. Each is then inspected to see whether it is both (1) validly published, and (2) legitimate: all names not complying with these two conditions are disregarded. Names published previously to the starting-point of nomenclature for the particular group are also disregarded (see § 8).

In a *genus,* the valid name is the earliest one published *as a generic name,* provided that it is in accordance with the rules of nomenclature, and is not a synonym of a conserved name (see § 15).

In a *species,* the valid name is the binary combination containing the earliest legitimate *specific epithet,* provided that this combination is in accordance with the rules of nomenclature.

Similarly, the valid name of a *variety* is the combination containing the earliest legitimate *varietal epithet.*

§ 8. STARTING-POINTS OF RECOGNIZED BOTANICAL NOMENCLATURE.

The general starting-point for *recognized* botanical nomenclature is 1753, the date of the appearance of Linné's *Species Plantarum,* ed. 1. This applies to all the Spermatophyta, Pteridophyta, Sphagnaceae, Hepaticae, Lichenes, Myxomycetes, and most of the Algae. The remaining Algae and the other groups start at various later dates.

The generic names used in the *Species Plantarum,* ed. 1, are unaccompanied by descriptions. They are, however, treated as having been validly published in 1753, and are associated with the corresponding descriptions published in Linné's *Genera Plantarum,* ed. 5 (1754).

All names published prior to 1753 are disregarded. Many of these old names, however, were validly published in or after 1753, by the same or different authors. Thus the names *Cicer arietinum* (used by Pliny in the first century of the Christian era), *Geranium nodosum* (used by Caspar Bauhin in 1623) and *Digitalis purpurea* (proposed by Fuchs in

1542) were adopted by Linné in *Sp. Pl.*, ed. 1 (1753), and date from that work, as far as recognised nomenclature is concerned.

§ 9. THE TYPE-METHOD OF APPLYING NAMES.

Much confusion has been caused in the past by the absence of method in the application of names (especially generic ones). When a genus including more than one species is described, it frequently happens that later workers have to divide it into two or more genera. The question immediately arises: which of these should bear the original generic name? The same problem has to be faced when a species is divided into two or more species. During the last twenty-five years, experience has shown that the best solution of the problem is to apply names according to the type-method. Under this method the name of a group is permanently attached to a particular element in that group, called the *type*. When the group is divided into two or more, its name remains attached to that part which includes the type.

The generic name *Pyrus* L. may serve as an example. Linné united three genera proposed by Tournefort, namely, *Pyrus* Tourn. (Pear), *Malus* Tourn. (Apple), and *Cydonia* Tourn. (Quince), into a single genus, *Pyrus* L. This included four species, *Pyrus communis* (Pear), *P. Malus* (Apple), *P. coronaria* (an American species of Apple), and *P. Cydonia* (Quince). When subsequent authors divided the Linnean genus *Pyrus* into three genera corresponding with its original elements, they rightly retained the generic name *Pyrus* for *P. communis*, the Pear, to which it originally belonged, *P. Malus* and *P. coronaria* being separated as the genus *Malus*, and *P. Cydonia* as the genus *Cydonia*. *P. communis* is said to be the *type* of the generic name *Pyrus*. So long as a generic name is accepted, the type-species must be retained within that genus. The term *type*, as used in nomenclature, is apt to be misleading to those who are not well acquainted with the Rules. The type-species is not necessarily the most typical species of the genus. It is the species on which the generic name was solely or primarily based, and it sometimes differs considerably from most other species in the genus.

Unfortunately, not all cases are so clear as that of *Pyrus*, and in many instances it is difficult to fix the type of a generic name. Sometimes none of the species has any greater claim to be regarded as type than the others, and in that case it is necessary to select a type-species, which is then called the *lectotype* (*i.e.*, chosen type) of the generic name. Provision was made at Cambridge in 1930 for a set of " Regulations for determining types." When these are prepared, they will be submitted for approval to the next International Botanical Congress. The following principles regarding types are, however, generally accepted :—

(1) If a genus when published contained only one species, that is the type of the generic name.

(2) If it contained more than one species, and the author indicated one as the type, that is accepted.

(3) If it contained more than one species, and one agrees better with the description than the others, it is accepted as the type, if the author failed to indicate one.

The type of a specific name is usually the specimen from which the description was drawn up. If there were more than one specimen, and none was indicated as type by the author, the one that agrees best with the description has claims to be regarded as type.

The type of a *name* or *epithet* remains the same when the group concerned is transferred to another genus or species, even if the transferring author has misidentified the group.

It is sometimes difficult to ascertain the type of a Linnean specific name. Most of the species included by Linné in his *Species Plantarum*, ed. 1, were previously known, and he was accordingly giving new names to old species. Occasionally he wrongly identified a specimen in his herbarium with an old species. In that case the type of the specific name may be the pre-Linnean description (or one of the descriptions) cited by Linné, and not the specimen in his herbarium.

The whole question of determining types of generic and specific names is still under investigation.

§ 10. Retention of Names or Epithets of Groups which are Remodelled or Divided.

An alteration of the diagnostic characters or limits of a group does not of itself warrant a change in its name. Such a change, however, may be required (1) if the group is transferred (see § 11); (2) if it is united with another group of the same rank (see § 12); or (3) if the rank of the group is changed (see § 13).

The genus *Betula* L., *Sp. Pl.*, 982 (1753), included what are now regarded as two genera. When it was split into these two, the name *Betula* was rightly retained for one of them, the pre-Linnean name *Alnus* being revived for the other.

The species *Lychnis dioica* L., *Sp. Pl.*, 437, included what are now regarded as two distinct species, namely the Red Campion and the White. When Miller in 1768 split it into these two species, he rightly retained the name *Lychnis dioica* for one of them, calling the other one *Lychnis alba* Mill.

§ 11. Retention of Epithets of Groups when these are Transferred to another Genus or Species.

When a species is transferred, *without change of rank*, to another genus, *the specific epithet must be retained*, unless one of the following obstacles exists: (1) that an earlier epithet is available, or (2) that the resulting binary combination is a later homonym (*i.e.*, that the same combination has been validly published previously for a different species).

Examples: *Antirrhinum spurium* L. (1753), on transference to *Linaria*, became *Linaria spuria* (L.) Mill. (1768). *Santolina suaveolens* Pursh (1814), on transference to *Matricaria*, cannot, however, be called *Matricaria suaveolens* (L.) Buchenau (1894) because that duplicates the previously and validly published name *Matricaria suaveolens* L. (1755) (see § 14). Hence the next available epithet is adopted, and the species becomes *Matricaria matricarioides* (Less., 1831) Porter. The epithet *discoidea* was not published for this species until 1837.

§ 12. Choice of Names when Two Groups of the Same Rank are United.

When two or more groups of the same rank are united, the *oldest* legitimate *name* or (in species and groups of lower rank) the *oldest* legitimate *epithet* is retained.

If the genera *Berberis* L. (1753) and *Mahonia* Nutt. (1818) are united, the combined genus must bear the earlier generic name, *i.e.*, *Berberis*.

If *Matricaria maritima* L. (1753) and *M. inodora* L. (1755) are regarded as conspecific, the combined species must be called *Matricaria maritima* L., since the specific epithet *maritima* antedates *inodora*.

Where the names (or epithets) of the groups united are of *the same date*, the author who unites the groups has the right of choosing one of the names (or epithets). The author who first adopts one of them, citing another as a synonym must be followed.

If *Cardamine* L. (1753) and *Dentaria* L. (1753) are treated as one genus, this must bear the name *Cardamine*, since that was chosen by Crantz in 1769, when he united the two genera.

§ 13. Choice of Name when the Rank of a Group is Changed.

When a group changes its rank, the earliest legitimate name or (in species and their sub-divisions) the earliest legitimate epithet *in the new rank* is adopted, unless that name or the resulting combination is a later homonym (see § 14).

Campanula sect. *Campanopsis* R. Br. (1810) was raised to generic rank by Schrader, who gave it the generic name *Wahlenbergia* Schrad. (1814). If treated as a *section*, the group bears its first *sectional* name, *Campanopsis*; if treated as a *genus*, it bears its first *generic* name *Wahlenbergia* (1814). The generic name *Campanopsis* (R. Br.) Kuntze (1891) must therefore be rejected.

Magnolia virginiana, var. *foetida* L. (1753), if regarded as a separate *species*, must bear the name *Magnolia grandiflora* L. (1759), not *M. foetida* (L.) Sarg. (1889), since *grandiflora* antedates *foetida* as a *specific* epithet.

Lythrum intermedium Ledeb. (1822), when treated as a *variety* of *Lythrum Salicaria* L., must be called *L. Salicaria*, var. *gracilius* Turcz. (1844), not *L. Salicaria*, var. *intermedium* (Ledeb.) Koehne (1881), since *gracilius* antedates *intermedium* as a *varietal* epithet.

In all these cases the name or epithet given to the group in its original rank is replaced by *the first legitimate name or epithet given to it in its new rank*.

§ 14. REJECTION OF LATER HOMONYMS.

A name of a taxonomic group must be rejected if it is a *later homonym*, that is if it duplicates a name previously and validly published for a different group of the same rank.

Just as *different names for the same group* are said to be *synonymous* with one another, or *synonyms*, so *identical names for different groups of the same rank* are said to be *homonyms*. Of two or more validly published homonyms, only the first can be used, the others being illegitimate (see § 5).

The Charlock, *Sinapis arvensis* L. (1753), when placed in the genus *Brassica*, cannot be called *Brassica arvensis* (L.) Rabenhorst (1839), because that duplicates the validly published name *Brassica arvensis* L. (1767). Its valid name under *Brassica* is *B. Sinapistrum* Boiss. (1839-45), which antedates *B. Sinapis* Vis. (1852). The fact that *Brassica arvensis* L. is now placed in another genus (*Moricandia*) is immaterial.

Similarly the name *Matricaria suaveolens* (L.) Buchenau is a later homonym and must be rejected (see § 11 for this example).

Certain generic names which are later homonyms are conserved (see § 15). This is the only exception to the homonym rule.

§ 15. CONSERVED GENERIC NAMES.

The publication of Linné's *Species Plantarum* in 1753 led to a very large output of work in systematic botany. Great advances were made in classification during the 114 years which followed, but unfortunately many systematic botanists were unaware of much of the work of their predecessors and contemporaries, owing to the lack of intercommunication and of bibliographical facilities. The permanence of names was thought to be comparatively unimportant, and botanists had no hesitation in altering names already given to particular groups, if these names seemed inappropriate or did not meet with their approval. Hence many early names came to be superseded by later ones, often because the latter were accompanied by better descriptions or had been proposed by botanists of greater eminence. The natural result was a great want of uniformity in nomenclature and consequent waste of time. Matters became so serious that a Botanical Congress was convened at Paris in 1867, and a set of " Laws of Botanical Nomenclature " prepared by Alphonse De Candolle was issued. This led to rather more uniformity in nomenclature for a time, but the " Laws " failed to secure general acceptance owing to the Congress not having been fully international or representative. Things came to a head after the publication of Otto Kuntze's *Revisio Generum Plantarum* (1891-93), a monument of bibliographical research, in which the author demonstrated the widespread neglect of earlier generic names in favour of later ones. Systematic botanists became divided into two camps: reformers of nomenclature who adopted the earliest name for each group, and those with strongly conservative views, who retained later names on the ground that they were better known. At the International Botanical Congress held at Vienna in 1905, a practical compromise was reached. The general principle of priority of publication was upheld, but about 400 well-known and long established generic names of Spermatophyta were specially conserved as *exceptions* to the Rules. About 50 additional names of Spermatophyta were conserved in 1910, and a list of conserved names of Algae was added. Further names proposed in 1930 are now under consideration.

The conserved generic names are principally such as have come into general use during the fifty years following their publication, or have been used in monographs and important floras. Each is conserved against all earlier synonyms, so long as the genus concerned is not united with another one bearing an earlier generic name. The name *Mahonia* Nutt. (1818) is conserved, for example, against *Odostemon* Raf. (1817), but if the genus is united with *Berberis* L. (1753), the name *Mahonia* ceases to be conserved, and is therefore superseded by *Berberis*. A conserved name is conserved also against all earlier homonyms.

A list of conserved names of genera represented in the British Flora appeared, along with the English text of the International Rules, as a Supplement to the *Journal of Botany* for 1906. This included the names *Calystegia*, *Capsella*, *Cnicus*, *Corydalis*, *Cynodon*, *Daboecia*, *Eranthis*, *Erophila*, *Falcaria*, *Glyceria*, *Hierochloë*, *Leersia*, *Listera*, *Loiseleuria*, *Luzula*, *Maianthemum*, *Malcolmia*, *Mertensia*, *Narthecium*, *Neottia*, *Oxytropis*, *Platanthera*, *Rynchospora*, *Simethis*, *Spergularia*, *Spiranthes*, *Suaeda*, *Taraxacum*, *Trinia* and *Wahlenbergia*.

§ 16. MODIFICATIONS INTRODUCED INTO THE INTERNATIONAL RULES IN 1930.

A large amount of textual revision was effected, certain rules which dealt with several distinct points were divided into two or more, and the rules as a whole were re-arranged in a form more convenient for consultation. Substantive changes were few.

In 1910 botanists were *recommended*, when publishing names of new groups, to indicate carefully the type of each: in 1930, a *rule* stating that the application of names of groups is determined by means of nomenclatural types was adopted. The principal change introduced was the rejection of *later homonyms* of validly published names. If a name has been validly published for one group, it cannot be used for a different group of the same rank (see § 14). This removes a source of ambiguity.

Names of new groups of living plants (*Bacteria* excepted) still need to be accompanied by a Latin diagnosis, but this now applies only to names published from 1932 onwards. The very numerous names of new groups published during the period 1908-1931 with diagnoses in modern languages are now legitimized. Previously these were treated as invalid.

§ 17. EXAMPLE OF THE WORKING OF THE RULES.

As a test of the working of the revised Rules the case of the Common Bladder-Campion may be taken. This was previously regarded as one of the most difficult in the realm of nomenclature. Six different names have been adopted for the species in recent years, owing to differences of opinion as to the precise interpretation of the International Rules:

these names are: *Silene Cucubalus* Wibel, *S. inflata* (Salisb.) Sm., *S. venosa* (Gilib.) Aschers., *S. vulgaris* (Moench) Garcke, *S. latifolia* (Mill.) Britt. et Rendle, and *S. angustifolia* (Mill.) Briq. The solution of the problem is now quite simple. The principal synonymy of the species is given below, each name being followed by the abbreviation "*leg.*" (legitimate) or "*illeg.*" (illegitimate).

1. *Cucubalus Behen* L. (1753), *leg.*
2. *Cucubalus latifolius* Mill. (1768), *leg.*
3. *Cucubalus angustifolius* Mill. (1768), *leg.*
4. *Cucubalus venosus* Gilib. (1782), *illeg.*
5. *Behen vulgaris* Moench (1794), *illeg.*
6. *Cucubalus inflatus* Salisb. (1796), *illeg.*
7. SILENE CUCUBALUS Wibel (1799), *leg.*
8. *Silene inflata* [Salisb.] Sm. (1800), *illeg.*
9. *Silene venosa* [Gilib.] Asch. (1864), *illeg.*
10. *Silene vulgaris* [Moench]Garcke (1869), *illeg.*
11. *Silene latifolia* (Mill.) Britt. et Rendle (1907), *illeg.*
12. *Silene angustifolia* (Mill.) Briq. (1910), *illeg.*

NOTES.

2, 3.—*Cucubalus latifolius* Mill. and *C. angustifolius* Mill. were published as new species, distinguished from *C. Behen* L. Hence it was legitimate for Miller to give them new names.

4.—*Cucubalus venosus* Gilib. was a *superfluous* name for *C. Behen* L., and was therefore illegitimate (§ 5).

5.—*Behen vulgaris* Moench. Moench included *Cucubalus latifolius* Mill. in the species, and ought therefore to have adopted the epithet *latifolius*, which was the only legitimate epithet available under the generic name *Behen*. As he failed to do so, the name *Behen vulgaris* is illegitimate. The epithet *Behen* could not be used under the generic name *Behen* (§ 5).

6.—*Cucubalus inflatus* Salisb., a *superfluous* name for *C. Behen* L., and therefore illegitimate.

7.—*Silene Cucubalus* Wibel (1799). Three legitimate epithets, *Behen*, *latifolius* and *angustifolius* had previously been published for the species. Wibel could not adopt the epithet *Behen*, because the resulting combination under *Silene* would have duplicated the name of *Silene Behen* L. (1753). Similarly, Wibel was unable to adopt either *latifolia* or *angustifolia*, because of the existence of the validly published names *Silene latifolia* Poir. (1789) and *S. angustifolia* Poir. (1789). Hence he was at liberty to choose a new specific epithet, and the name SILENE CUCUBALUS Wibel is therefore the valid name, under *Silene*, for the Bladder-Campion.

8, 9, 10.—*Silene inflata* Sm., *S. venosa* Asch., and *S. vulgaris* Garcke. These three are superfluous names for *S. Cucubalus* Wibel, and are therefore illegitimate. Although the epithets *inflata*, *venosa*, and *vulgaris* were published before the name *Silene Cucubalus*, each was published (by Salisbury, Gilibert and Moench respectively) as part of an *illegitimate name*, and any *new combination* founded upon it has accordingly no status under the Rules, but must stand on its own merits. Hence the names of Salisbury, Gilibert, and Moench are cited in square brackets; and the names *Silene inflata*, *S. venosa* and *S. vulgaris* are attributed directly to Smith, Ascherson and Garcke respectively.

11, 12.—*Silene latifolia* (Mill.) Britt. et Rendle and *S. angustifolia* (Mill.) Briq. As shown above, under No. 7, these are later homonyms of *S. latifolia* Poir. and *S. angustifolia* Poir., and must therefore be rejected.

THE ADVENTIVE FLORA OF THE PORT OF BRISTOL.

CECIL I. SANDWITH.

INTRODUCTION.

The origin of the City of Bristol is lost in antiquity, but the mouth of the Avon appears to have been the terminal port of the Phœnicians prior to the Roman Conquest. During the Roman occupation Bristol was constituted its main outpost in the West, and so became the market for trade with the countries beyond. After Alfred the Great and for many centuries Bristol was, second to London, the principal seaport of England, a position she held until the industrial revolution early in the 19th century resulted in the transfer of so large a proportion of the population from southern to northern England. The 16th century, which began with the discovery of America, included the foundation of the extensive trade with Spain and Portugal, with the West Coast of Africa, and with the West Indies, and so in the 18th century Bristol was in possession of three great trades—wines from Spain; palm oil and slaves from Africa; sugar from Jamaica, and tobacco from Virginia.

The ships in which Cabot sailed to America or Vasco da Gama to the East Indies were hardly half the size of some of the barges now plying between Avonmouth and Bristol. They had to lie aground at low tide, for at this time enclosed docks were unknown. It is recorded that the first wharf at Bristol was constructed in 1239. In 1712, a dock was provided at Sea Mills, at the outfall of the river Trym. This dock was built for the accommodation of the whaling fleet, a regular feature of the trade of those days. In 1762 the Merchant Dock was constructed but, with these two exceptions, the port remained a tidal one. It became apparent, however, in the latter half of the 18th century that some bold action was necessary to enable the port to maintain its position. This led to the construction of a lock entrance near Hotwells, dams at Rownham and Netham, and the diversion of the tidal course by means of a channel called the New Cut. This work was completed in 1809. In the latter part of the 19th century the city found itself in danger of losing some of its commerce through the construction of ships too large to navigate the river. In the meantime docks were built by private companies at Portishead and Avonmouth. These docks were acquired in 1884 by the Corporation, who abandoned the project of dockising the river, and concentrated on Avonmouth. The Royal Edward Dock was opened in 1908, and a further extension was opened by the Prince of Wales in 1928. Finally there came the construction of the splendid Portway*, following the river-bank and connecting the outer docks at Avonmouth with the City of Bristol.

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*See a paper by Prof. Reynolds in *Proc. Bristol Nat. Society*, 1926, for the effect on the Avon section of the Construction of Portway (Geological).

The property in the port, as provided by nature, has been vested in the City of Bristol from time immemorial. The title was confirmed in writing by a charter granted by King John in 1190, but there is evidence of even earlier charters than that. There are records in the reigns of Henry III and the first two Edwards of grants enabling the city authorities to collect tolls on ships coming to the port, although a charter of Edward III appears to be the first authority to collect dues on goods. Bristol is unique in being the only municipally-owned first-class port in the country. Many and notable are the names of those who have landed at the Port of Bristol, or who have sailed from thence to achieve glory and discover new lands. Alexander Selkirk, the inspiration of Defoe's immortal "Robinson Crusoe," landed at Bristol in the year 1711, after his rescue from the island of Juan Fernandez. He was brought home by Captain Woodes Rogers, upon the site of whose house in Queen's Square the present docks offices now stand.

At the present day the Port of Bristol is a distributing centre for the great manufacturing districts of Birmingham and the Black Country, for the West and South of England, and for South Wales. The total grain import through the docks is 10% of the total received in the United Kingdom. More than half the total import of bananas into the United Kingdom comes via Avonmouth, and during 1930 over 6,000,000 bunches arrived there from America. The *European* and *Mediterranean* trade is mainly in general cargo and is accommodated at the City Docks. There are regular lines to Scandinavia and the Baltic ports, to Holland, France, Spain and Portugal, Italy and Sicily; while the Levant Line trades with the Levant ports and Egypt. There are also lines to and from Rangoon and Colombo. Besides grain, there is an extensive trade in oranges, lemons and other fruits from the Mediterranean ports. From *S. Africa* maize, meal and sugar arrive at Avonmouth; while from the *West Coast* come cocoa, hides, mahogany, ivory, ground-nuts, palm kernels, palm oil, etc., and tobacco from Rhodesia. From *America* the principal imports are bananas and tobacco, grain, oilseeds, coffee, apples, canned goods, lumber, asphalt. From *Australia* and *New Zealand* are imported dairy produce, frozen meat and grain. Finally we may mention the rice and tea from the *Far East*, and the timber and soya beans (*Glycine Soja*) from *Manchuria* and *Siberia*.

For the purposes of this paper the Port of Bristol includes the docks at *Portishead* (N. Somerset) and *Avonmouth* (W. Gloucester), with the city docks, dumping grounds and waste places, where dredgings and city refuse are deposited. For many years *St Philip's Marsh*, by the Feeder Canal near Temple Meads Station, was the most important of these places, and was responsible for the majority of alien plants cited in White's Flora. These were chiefly of Mediterranean origin, introduced with grain siftings. In recent years little has been observed there, owing to altered conditions. St Philip's Marsh is in the county of Gloucestershire, and is divided by the river Avon from *St Anne's* (Brislington) on the N. Somerset side, with its large malodorous Corporation tip and allotment ground bordering the G.W. Railway. *Bedminster* and *Ashton Gate* are on the Somerset side, and are constantly changing with the increased demand for allotments which, after a few years of cultivation and levelling, eventually become sites for building.

Kingswood and *Eastville* lie in the Gloucestershire portion of the city, and were once famous dumping places, but the latter has been enclosed and is no longer available. *Wee Lane, Baptist Mills, Boiling Wells* and *Ashley Hill*, lie in the parish of St Werburgh (Glos.) and were notable in bygone days for unenclosed fowl-runs, waste ground, and allotment heaps. Here again great changes have been made by the extension of the South Wales Railway. In *Cranbrook Road* and at *Redland* (Glos.) are waste pieces of land, gradually disappearing as allotments or building sites among the newer residential quarters of the city.

In the early days of Bristol botany, with its trade limitations due to difficulties of navigation, the alien plants arriving in the port were principally brought with grain (e.g., Syrian barley) from the Mediterranean region but, during the Great War and after, a notable change took place. The channels of trade were diverted and more adequate provision made for shipping, which brought in a variety of strange plants from other countries hitherto unknown here. Species of *Amaranthus*, *Ambrosia*, *Xanthium*, *Alternanthera*, *Bidens* and *Solanum* were imported from California, Mexico, the West Indies, and the Far East. The remount camps were responsible for such N. American adventives as *Rudbeckia*, *Lepachys*, *Tagetes* and many species of *Helianthus*. The turn of trade from Europe caused the substitution of *Anethum* (*Peucedanum*) *graveolens* for the Caraway, formerly used in drugs and confectionery. Crops of this delicate little yellow-flowered Umbellifer came up spasmodically during the War years on the city tips. The increasing grain trade at Avonmouth Docks in recent years has been responsible for the introduction of *Agropyrum tenerum* Vasey (more correctly known as *A. trachycaulum* (Link) Malte), which is well known as a cultivated fodder crop in N. America; this grass became established in 1926-30. Other grasses new to Britain in recent years were *Hordeum compressum* Griseb. and *Stipa hyalina* Nees (Argentina), *Eriochloa villosa* Kunth (China, Japan) and *Agrostis hyemalis* (Walt.) B.S.P. (N. America). Amongst other striking new plants from the Far East of the Old World were two unusual Labiates, *Elsholtzia Patrini* (Lepech.) Garcke and the monotypic genus, *Amethystea* L., probably introduced with the soya beans, of which seedlings are found scattered along the dock railway lines at Avonmouth; while from Temperate South America came *Oenothera argentina* and *Rumex cuneifolius*.

The names of leading botanists connected with the City of Bristol, including the famous explorer, Sir Joseph Banks, will be found in the introduction to the Flora of Bristol (1912) by J. W. White, whose records of alien plants noted in the area under observation form the foundation of this work.

Mr White and his colleague, Mr C. Bucknall, were keenly interested in the alien flora of Bristol; their specimens are preserved in their herbaria which are now in the possession of the University of Bristol, and to which I have had access, by the kindness of Prof. O. V. Darbishire. Since the publication of the Bristol Flora a very large number of additions have been made to the list of adventive species, while some which were still rare enough in 1912 to deserve an enumeration of localities have become so familiar and widespread as to forfeit that distinction. Good examples of the latter class are *Sisymbrium altissimum*, *S. orientale*, *Thlaspi arvense*, *Melilotus indica* and *Crepis taraxacifolia*. The most active local workers in recent years have been Messrs H. J. Gibbons and Ivor W. Evans and Miss I. M. Roper. These botanists have most kindly supplied me with lists and have allowed me to examine specimens in their herbaria. Between 1916 and 1918 a great many records were made by the Misses M. and A. B. Cobbe and by the late Dr G. C. Druce, mainly from St Philip's Marsh and from Bedminster, and a useful list of adventive species collected in the former locality was published in the Report of the Botanical Society and Exchange Club of the British Isles for 1916. My friend, Mr T. H. Green, of Bath, has occasionally visited the Bristol tips and has added some interesting records. My own observations and notes cover a period of twenty-two years' collecting, frequently in the company of my son, and specimens of the great majority of the species listed below will be found in our herbarium, while many of the records have appeared in the Reports of this Society and Club. I have deemed it advisable to prefix with an asterisk those species which I have never myself found within the area and of which I have seen no specimens, either from lack of time or of opportunity for verifying the records.

In reflecting on the preparation of this list my thoughts naturally turn first to the late Dr G. C. Druce, who more than any British botanist of recent years understood the reasonableness and utility of a study of our adventive flora, and keenly encouraged and stimulated the workers in this field. For many years he was of the greatest assistance to me in the identification of specimens, and was the channel by which they passed to the great continental alienologist, the late Dr A. Thellung, and to the late Dr J. Murr. Since his death Mr John Chapple has most kindly forwarded some of my material to such well-known authorities as Dr O. E. Schulz on Cruciferae, and Dr Paul Aellen on *Chenopodium*. While I was at Kew last autumn I had the good fortune to meet Dr Ivan Johnston, of the Arnold Arboretum, U.S.A., who identified some of my Boraginaceae and gave me his views on Bristol specimens of the genus *Amsinckia*. Above all, my thanks are due to the Director of the Royal Botanic Gardens, Kew, for permission to work in the Kew Herbarium and Library. A series of visits there has enabled me to settle innumerable doubtful points and practically to complete the identification of all the aliens that I have at any time collected at Bristol. Several members of the Herbarium staff have given me their advice and help, but I wish particularly to record my thanks to Mr N.

Y. Sandwith for his constant collaboration both in the field and the herbarium, and to Mr C. E. Hubbard, the international authority on the Gramineae, for his great kindness in examining numerous critical specimens.

The history of the Port has been taken from an article in the Journal of the Chamber of Commerce, December 1932, by kind permission of the General Manager of the Port of Bristol Authority, while notes on the imports have been taken from a booklet entitled "Facts and Figures relating to the Port and its Docks," issued by the Port of Bristol Authority in 1931.

ARRANGEMENT OF THE LIST.

The order follows that of the last edition of Druce's *British Plant List*, except where this separates closely allied genera or species by others with which they have little affinity. Frequent instances of this occur, and I have entirely re-arranged the species of some genera. Druce's nomenclature has been corrected in some instances where it is clearly wrong or does not follow the existing Rules of International Nomenclature, while in others the most recently discovered correct name has been substituted for his, but no attempt has been made to make this list nomenclaturally perfect. The native distribution of each species, and of some of the varieties, is added after the Bristol localities.

PRINCIPAL SIGNS AND ABBREVIATIONS.

Cat.—Catalogue.

Herb.—Herbarium.

Journ. Bot.—The Journal of Botany, British and Foreign.

Medit. Reg.—Mediterranean Region, as comprising the flora ranging from the Canary Islands to N.W. India and including all countries bordering the Mediterranean Sea. This region thus includes "the Orient."

Proc. Brist. Nat. Soc.—Proceedings of the Bristol Naturalists' Society.

Rep. B.E.C.—Report of the Botanical Society and Exchange Club of the British Isles.

S.—Sandwith; collected by C. I., and often by N. Y., Sandwith, the specimen usually to be found in their herbarium.

Swete Fl.—E. H. Swete, Flora Bristoliensis, London, 1854.

White Fl.—J. W. White, The Bristol Flora, Bristol, 1912.

White Notes Suppl. Fl.—J. W. White, Notes Supplemental to the Flora of Bristol, in Journ. Bot., 1918.

*—Species marked thus have never been collected by the writer at Bristol; and she has neither seen nor examined specimens of them, nor in any way verified the records.

LOCALITIES IN N. SOMERSET, V.-C. 6.

All the localities mentioned in the list are in W. Gloucester, v.-c. 34, except the following, which are in N. Somerset, v.-c. 6:—

Arno's Vale.
Ashton Gate, Avenue and Vale.
Bedminster.
Brislington.
Cumberland Road (New Cut).
Fox's Wood Quarries.
Knowle.
Leigh Woods.
Long Ashton.
Luckwell Road (Bedminster).
New Cut.
Pill.
Portishead Station-yard and Dock.
Rownham Ferry.
St Annes.

STATISTICAL SUMMARY.

Total Number of Bristol Adventive Species, ... 717, in 52 families.
Composition.—Of this total no less than 609 species are members of only 14 families, in the following order:—

Compositae	111	Caryophyllaceae	25
Gramineae Leguminosae	93	Scrophulariaceae	23
		Boraginaceae	21
Cruciferae	82	Polygonaceae	18
Labiatae	37	Solanaceae	17
Umbelliferae	33	Amaranthaceae	14
Chenopodiaceae	30	Papaveraceae	12

ORIGIN OF THE SPECIES.

From the Mediterranean Region, and Central or Eastern Europe—The large majority.
Extra-European, and exclusively from N. Africa, Abyssinia and the Orient—At least 28.
Almost exclusively from E. Russia and Temperate Asia—At least 25.
Almost exclusively from Tropical Africa—1 (*Celosia trigyna*).
Almost exclusively from South Africa—2 (*Cryptostemma calendulaceum*, *Amaranthus Thunbergii*).
Almost exclusively from N. America and Mexico—56.
Almost exclusively from Temperate S. America—26.
Widely distributed throughout America—15.
Pantropical Weeds—*Gynandropsis gynandra*, *Corchorus olitorius*, *Ipomoea purpurea*, 2 *Physalis* spp., several *Amaranthus* spp., *Ricinus communis*. *Commelina communis*. *Cyperus difformis* and numerous *Gramineae*.

LIST OF THE SPECIES.

RANUNCULACEAE.

Adonis aestivalis L. St Philip's Marsh. 1916, *Miss Roper*. Avonmouth Docks, 1931, *S.* Portishead Station-yard, 1907, *Miss Roper*.—Medit. Reg.

Ranunculus arvensis L. Common.—Europe and Medit. Reg.

*R. muricatus L. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1916.—Medit. Reg.

R. SARDOUS Cr. St Philip's Marsh, 1905. *White Fl.* Ashton Gate; Shirehampton, 1914, *S.* and *Green.* Avonmouth.—Europe and Medit. Reg.

*R. TRILOBUS Desf. Portishead Mill-yard, 1914-15, *Miss Roper*, see *White Notes Suppl. Fl.*—Medit. Reg.

NIGELLA GALLICA Jord. Baptist Mills, 1925, *S.*—France, Spain.

N. DAMASCENA L. Occasional, *e.g.* Arno's Vale, 1912, *Miss Roper.*—Medit. Reg.

DELPHINIUM AJACIS L. Old colliery workings, Kingswood, 1883-8, *White Fl.* St Philip's Marsh, 1902, *White Fl.* Bedminster, 1922, *S.*—Medit. Reg.

D. CONSOLIDA L. "Mentioned in an anonymous list of Bristol plants, date about 1830," *White Fl.* St Philip's Marsh, 1904, *White Fl.* Bedminster, 1932, *S.* Shirehampton, 1912, *S.* Avonmouth, 1926, *S.*—Medit. Reg.

PAPAVERACEAE.

PAPAVER SOMNIFERUM L. Common as an outcast.—Medit. Reg.

P. DUBIUM L. and P. RHOEAS L. Common.—Europe and Medit. Reg.

P. LECOQII Lamotte. Abundant on refuse at South Liberty Colliery, Ashton Gate, 1906, *F. Samson* in *White Fl.* On ballast between Shirehampton and Avonmouth, 1919, *S.*—Europe, Medit. Reg.

P. ARGEMONE L. Railway sidings, Shirehampton, *S.*—Europe, Medit. Reg.

P. HYBRIDUM L. St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, 1930, *S.* Portishead Station-yard, *Miss Livett* in *White Fl.*—Europe, Medit. Reg.

GLAUCIUM CORNICULATUM (L.) Curt. A frequent alien with imported grain at Bristol, Avonmouth and Portishead. First record, St Philip's Marsh, 1902, *White Fl.*—Medit. Reg.

ROEMERIA HYBRIDA (L.) DC. St Philip's Marsh, 1916, *Misses Cobbe.* Baptist Mills, 1913, *Evans.* Bedminster, 1922, *S.* Railway sidings, Shirehampton, *Green.* Portishead Station-yard, 1906, *Miss Livett* in *White Fl.* Tip at Portishead South, 1914, *S.*—Medit. Reg.

CHELIDONIUM LACINIATUM Mill. Waste land, Cranbrook Road, Bristol, 1928-9, *Gibbons.*—Europe, Asia.

ESCHSCHOLZIA DOUGLASII Walp. St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, *Gibbons.*—California.

HYPECOUM PENDULUM L. St Philip's Marsh, 1905, *Miss Roper.* Portishead Station-yard, 1907, *Miss Roper.* Railway siding between Shirehampton and Avonmouth, 1916, *S.*—Medit. Reg.

*H. PROCUMBENS L. Portishead Dock, 1907, *Miss Livett* in *White Notes Suppl. Fl.*—Medit. Reg.

FUMARIACEAE.

FUMARIA MICRANTHA Lag. Casual at Bedminster, 1922, *S.*—Europe, Medit. Reg., etc.

CRUCIFERAE.

NASTURTIUM PALUSTRE DC., var. FALLAX (Beck) O. E. Sch. Avonmouth Docks, 1932, *S.*, det. *O. E. Schulz.*—The typical plant almost throughout the world.

N. SYLVESTRE DC. Avonmouth Docks, 1932, *S.*—Europe, Medit. Reg.

BARBAREA VERNA Asch. Rather frequent at Bristol, along Portway, at Shirehampton and Avonmouth.—W. Europe.

B. INTERMEDIA Bor. Field road from Sneyd Park to the riverbank, 1905; and railway-bank under the Downs, 1909, *Wall* in *White Fl.* Railway sidings, Avonmouth Docks, 1931, *S.* Portishead Station-yard, 1904, *White Fl.*—Europe.

B. ARCUATA (Presl) Reichb., var. BRACHYCARPA (A. B. Jackson). Baptist Mills, 1928, *S.*—Europe, Medit. Reg.

*ARABIS GLABRA (L.) Bernh. (A. PERFOLIATA Lam.). Two very old records, see *White Fl.*, 145.—Europe, Asia.

*A. ALPINA L. The White House or Whitehall, between Bristol and Kingswood, two very old records, see *White Fl.*, 145, and *Notes Suppl. Fl.*—Europe, N. Asia.

LUNARIA REDIVIVA L. and L. ANNUA L. occur as outcasts.—Europe, N. Asia.

ALYSSUM ALYSSOIDES (L.) L. New road near the Channel N. of Avonmouth, 1915, and persisting several years, *Miss Roper* in *White Notes Suppl. Fl.*—Medit. Reg.

*A. CAMPESTRE L. St Philip's Marsh, 1901, *White Fl.* Portishead Station-yard, 1906-7, *White Fl.*—Medit. Reg.

A. INCANUM L. Kingswood, 1882, *White Fl.* Bristol Harbour, 1911, *Miss Roper.* St Philip's Marsh, 1913, *S.* Railway bank, Brislington, 1915, *Thompson.* Avonmouth Docks, 1931, *S.* Portishead Dock, 1905, *Miss Peck* in *White Fl.*—N. and Central Europe, N. Asia.

A. MARITIMUM Lam. A frequent garden-outcast and casual.—Medit. Reg.

COCHLEARIA ARMORACIA L. Common.—Cult., Eastern Russia (fide Rouy and Foucaud).

MALCOMIA MARITIMA R. Br. St Anne's, 1926, *S.* Avonmouth Docks, 1932, *Gibbons.*—Medit. Reg. (mainly eastern).

M. AFRICANA R. Br. St Philip's, 1902, *White Fl.*; and *Misses Cobbe* in *Rep. B.E.C.*, 1919. Portishead railway-sidings, 1907-9, *Miss Roper* and *Miss Hill* in *White Fl.* Portishead South, 1914, *S.*—Medit. Reg.

SISYMBRIUM (DESCURAINEA) SOPHIA L. Rather common on rubbish tips at Bristol, Avonmouth and Portishead. First record, St Philip's, 1901, *White Fl.*—Europe, Asia, N. Africa.

S. (DESCURAINEA) MULTIFIDUM (Pursh) M'Mill. Bedminster, 1922, *S.*, det. *Thellung.*—N. America.

S. ALTISSIMUM L. (S. PANNONICUM Jacq.). Very common. First record, St Philip's Marsh, 1887, *White Fl.*—Medit. Reg.

S. ORIENTALE L. (S. COLUMNAE Jacq.). Common. First record, Portishead railway-sidings, 1896, *White Fl.*—Medit. Reg.

S. IRIO L. St Philip's Marsh, 1904, *White Notes Suppl. Fl.*; 1922, *S.* Bedminster, 1922 and 1930, *S.* Portishead Dock, 1909, *Miss Roper* in *White Notes Suppl. Fl.*—Medit. Reg.

S. LOESELII L. Brislington, 1916, *Miss Cobbe.* St Philip's Marsh, 1922, *S.* Avonmouth Docks, 1928, etc., *S.*—Central Europe, E. Medit. Reg.

S. WOLGENSE M. Bieb. (S. HISPANICUM of *White Fl.*, not of Jacquin). St Philip's Marsh, 1896, *Bucknall* in *White Fl.*, and subsequently; 1916, *Druce*; see *Rep. B.E.C.*, 1919, 548. Avonmouth Docks, 1927, *S.*—S.E. Russia.

*S. ERYSIMOIDES Desf. St Philip's Marsh, 1916, *Druce* and *Misses Cobbe* in *Rep. B.E.C.*, 1917.—Medit. Reg.

S. OFFICINALE L., var. LEIOCARPUM DC. St Philip's, 1906, *Miss Roper* in *White Fl.* Arno's Vale, 1912, *White Notes Suppl. Fl.* Railway sidings, Shirehampton, 1917, *S.*—Europe, Medit. Reg.

S. POLYCERATIUM L. St Philip's, 1922, *S.* Bedminster, 1922, *S.*—Medit. Reg.

ERYSIMUM CHEIRANTHOIDES L. Common. First record, St Anne's. *Herb. Stephens* in *White Fl.*—Europe, Medit. Reg. and N. Asia.

E. REPANDUM L. St Philip's Marsh and the Feeder Canal, 1892-1909, *White Fl.*; 1914, *S.* Bedminster, 1928, *S.* Ashton Gate, 1922, *S.* Avonmouth Docks, 1929, *S.*—Medit. Reg.

CONRINGIA ORIENTALIS (L.) Dum. Quite frequent, especially on corn-siftings. First record, St Philip's Marsh, 1888, *White Fl.*—Medit. Reg.

*C. AUSTRIACA Sweet. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1916.—Central Europe and E. Medit. Reg.

CAMELINA SATIVA Crantz. Frequent with corn-siftings. First record, colliery waste at Kingswood, 1880, *White Fl.*—Europe and Medit. Reg.

C. SYLVESTRIS Wallr. St Philip's, 1902-8, *White Fl.* St Anne's, 1905, *Wall.* Baptist Mills, 1916, *Misses Cobbe.* Bedminster, 1922, *S.* Avonmouth Docks, 1929, *S.*—Medit. Reg.

BRASSICA RAPA L. and var. BRIGGSII Wats. Common, see *White Fl.*—Cult.

B. RUTABAGA DC. Occasional, *e.g.* Avonmouth Docks, 1931, *S.*—Cult.

B. CHEIRANTHOS Vill. Railway bank, Ashley Hill, 1928, *S.*—Central and W. Europe.

*B. TOURNEFORTII Gouan. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1919.—Medit. Reg.

B. ELONGATA Ehrh. Waste heap, Kingswood, 1881-91, *White Fl.*—E. Medit. Reg.

Var. INTEGRIFOLIA Boiss. (B. PERSICA Boiss. et Hohen.). Bedminster, *Misses Cobbe* in *Rep. B.E.C.*, 1918. Avonmouth Docks, 1927-32, *S.* Portishead Dock, 1929, *S.*—E. Medit. Reg.

B. NIGRA L. Common.—Europe, Medit. Reg.

B. ARVENSIS (L.) Kze. and var. ORIENTALIS (L.) Asch. Common.—Europe, Medit. Reg.

B. ALBA (L.) Boiss. Frequent.—Europe, Medit. Reg.

B. DISSECTA (Lag.) Boiss. Rubbish-tip, Horfield, 1915, *Miss Roper*, vide spn. in her Herb. St Philip's, *Misses Cobbe* in *Rep. B.E.C.*, 1919.—Medit. Reg.

B. JUNCEA Coss. et Czern. Common and increasing; a grain alien.—E. Russia, Central Asia.

B. GALLICA (Willd.) Druce. (ERUCASTRUM POLLICHII Shuttlew.). Frequent, Bristol and Avonmouth Docks.—Central Europe.

B. ERUCASTRUM Vill. (ERUCASTRUM OBTUSANGULUM Reichb.). Baptist Mills, 1925, *S.*—Central Europe.

B. INCANA (L.) Boiss. St Philip's Marsh, 1916, *Misses Cobbe*. Avonmouth Docks, 1923 and subsequently, well established, *S.*—Medit. Reg.

DIPLOTAXIS TENUIFOLIA (L.) DC. First observed sparingly in St Philip's Marsh by *T. B. Flower* in 1841. Since then it has spread everywhere and frequently covers waste ground and railway banks, see *White Fl.* Earliest local record, *Huds. Fl. Angl.* (1778).—Europe, Medit. Reg.

Var. INTEGRIFOLIA Koch. Avonmouth Docks, 1929, *S.*—With the typical plant.

D. MURALIS (L.) DC. Common. "One of the best examples of a quickly advancing colonist," *White Fl.*—Europe, Medit. Reg.

Var. CAULESCENS Kittel. (var. BABINGTONII (Syme)). Occasional, *e.g.* St Philip's Marsh, 1916, *Misses Cobbe.*—With the typical plant.

*D. VIMINEA DC. Baptist Mills, 1916, *Misses Cobbe.*—Central Europe, Medit. Reg.

D. CATHOLICA DC. Chicken-run, Wee Lane, 1922, *S.*, det. *Thellung.*—W. Medit. Reg.

D. TENUISILIQUA Del. (D. AURICULATA Dur.). Baptist Mills, 1927, *S.*—N. Africa.

*D. ERUCOIDES DC. Bedminster, *Misses Cobbe* in *Rep. B.E.C.*, 1919.—Medit. Reg.

ERUCA SATIVA Mill. Frequent, but often passed over as *Raphanus Raphanistrum*. St Philip's Marsh, *Misses Cobbe.* Ashton Gate, Avonmouth, *S.*, etc.—Medit. Reg.

CORONOPUS DIDYMUS Sm. Common.—Native of America, naturalised throughout the old world.

C. RUELLII All. Common.—Europe, and a weed throughout the world.

LEPIDIUM LATIFOLIUM L. St Philip's Marsh, 1900-11, *White Fl.* and subsequently (last seen in 1928). Perhaps native.—Europe, Medit. Reg.

L. DRABA L. Very common in suitable ground. Earliest local record, 1828, *W. Christy* in *Herb. Watson*, vide *White Fl.*—Europe, Medit. Reg.; alien in America.

L. CAMPESTRE (L.) R. Br. Avonmouth Docks, 1925, *S.*—Europe, Medit. Reg.

L. PERFOLIATUM L. Frequent as a grain alien at Bristol, Shirehampton, Avonmouth and Portishead. First record, St Philip's, 1902, *White Fl.*—Medit. Reg.

L. SATIVUM L. Occasional as an outcast, *e.g.* St Anne's, 1920, *S.*; Ashton Gate, 1921, *S.*—E. Medit. Reg. and Cult.

L. GRAMINIFOLIUM L. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1916. Avonmouth Docks, 1925 and subsequently, *S.*—Central Europe, Medit. Reg.

L. RUDERALE L. Common on rubbish-heaps, docks and quays. Earliest record, St Vincent's Rocks, 1726, *Herb. Dillenius,* vide *White Fl.* —Europe, Med. Reg.

L. BONARIENSE L. St Philip's Marsh, 1916, *S.* and *Druce.* St Anne's, 1917, *S.* Bedminster, 1922, *S.*—Temp. S. America.

L. VIRGINICUM L. Rather common.—N. and S. America, West Indies.

L. NEGLECTUM Thell. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.* Portishead Dock, 1921, *S.*—N. America.

L. DENSIFLORUM Schrad. Bristol, 1923, *S.*, det. *Thellung.* Eastville, 1919, *S.*, det. *Schulz.* St Anne's, 1927, *S.* Avonmouth Docks, 1925, *S.*, and subsequently.—N. America.

Forma MICROCARPUM Thell. Ashton Gate, 1919, *S.*

L. RAMOSISSIMUM A. Nels. St Philip's Marsh, 1916, *S.* St Philip's, *Druce* in *Rep. B.E.C.*, 1919. Waste ground, Shirehampton, 1919, *S.*, det. *O. E. Schulz.*—N. America.

THLASPI ARVENSE L. Common. First record, on dredgings in the Black Rock Quarry, 1883, *White Fl.*—Europe, Medit. Reg.

*IBERIS AMARA L. Portishead Station-yard, 1904, *White Fl.*—W. and Central Europe.

I. UMBELLATA L. Garden outcast, *e.g.* Eastville, 1918, *Miss Roper.*—Medit. Reg.

I. ACUTILOBA Bert. Bedminster, 1922, *S.*; this was recorded as *I. odorata* in *Rep. B.E.C.*, 1923, 29.—Greece.

VOGELIA PANICULATA (L.) Hornem. Frequent on corn-siftings and in chicken-runs. First record, St Philip's Marsh, 1903, *White Fl.* —Medit. Reg.

MYAGRUM PERFOLIATUM L. St Philip's Marsh, 1904, *White Fl.*; 1916, *Misses Cobbe.* St Anne's, 1922, *S.* Bedminster, 1922, *S.* Shirehampton railway-sidings, 1924, *S.* Avonmouth Docks, 1928, *S.* —Medit. Reg.

*BUNIAS ERUCAGO L. Portishead Dock, 1906, *Miss Livett* in *White Notes Suppl. Fl.*—Medit. Reg.

B. ORIENTALIS L. Avonmouth Docks, 1932, *Gibbons.*—E. Europe, Caucasus and Turkey in Asia.

RAPISTRUM PERENNE (L.) All. St Philip's Marsh, 1902, *White Fl.*; 1924, *S.* St Anne's, 1923, *S.*—Central and E. Europe.

R. RUGOSUM (L.) All. Most of the Bristol specimens which have been identified as this species, or as its race *R. orientale,* prove on examination to be referable to *R. hispanicum*. For the characters distinguishing these species see O. E. Schulz's recent monograph in Engler, Pflanzenreich, iv, 105, p. 254 (1919). The only Bristol specimen seen which can be referred with any confidence to *R. rugosum* is one collected by *Miss Roper* at Arno's Vale in 1914.—Central Europe, Medit. Reg.

R. HISPANICUM (L.) Crantz. (R. LINNAEANUM Boiss. et Reut.). Frequent —Medit. Reg.

Var. HIRSUTUM (Cariot) O. E. Schulz. Evidently frequent. *e.g.* Baptist Mills, 1927, *S.*; Bedminster, 1926, *S.*; Avonmouth, 1928, *S.*—Medit. Reg.

ERUCARIA ALEPPICA Gaertn. Shirehampton, 1912, *S.*—E. Medit. Reg.

RAPHANUS RAPHANISTRUM L. Common, with various colour forms.—Europe, Medit. Reg.

R. LANDRA Moretti. Avonmouth Docks, 1926, *S.*—Medit. Reg.

R. SATIVUS L. Common.—Europe, Medit. Reg. and Cult.

CHORISPERMUM TENELLUM R. Br. Avonmouth Docks, 1929 and 1931, *S.*—S. Russia, Orient.

CAPPARIDACEAE.

GYNANDROPSIS GYNANDRA (L.) Briquet. (G. PENTAPHYLLA DC.). Baptist Mills, 1925, *S.*, the first British record.—Tropics.

RESEDACEAE.

RESEDA ALBA L. Colliery rubble, Kingswood, *White Fl.* St Philip's Marsh, 1900-4, *White Fl.* Eastville, 1917, *S.* Redland Green, *Evans.* Ashton Gate, 1922, *S.* Avonmouth Docks, *S.*—Medit. Reg.

R. LUTEA L., var. PULCHELLA J. Muell. (R. GRACILIS Reichb. non Tenore). St Philip's Marsh, *White Notes Suppl. Fl.* Avonmouth Docks, 1932, *S.* Portishead Dock, *White Notes Suppl. Fl.*—Central Europe.

R. LUTEOLA L., var. CRISPATA (Link) J. Muell. St Philip's Marsh, 1920, *S.* This is the plant recorded as new to Britain in *Rep. B.E.C.*, 1920, 15, as *Astrocarpus sesamoides* (Gouan) DC., a name which presumably should be deleted from the British list.—Medit. Reg.

[ASTROCARPUS SESAMOIDES (Gouan) DC. Error, see under *R. Luteola*, var. *crispata*.]

FRANKENIACEAE.

FRANKENIA PULVERULENTA L. Avonmouth Docks, 1928, *S.*—Medit. Reg.

CARYOPHYLLACEAE.

*KOHLRAUSCHIA PROLIFERA (L.) Kunth. (DIANTHUS PROLIFER L.). Colliery heap, Kingswood, 1882-9, *White Fl.*—Europe, N. Asia, N. Africa.

*DIANTHUS PLUMARIUS L. Cloister walls, Bristol, 1840, *Rogers* in *White Fl.*—Central Europe.

*GYPSOPHILA PANICULATA L. Old colliery heap, Kingswood, *White Fl.* St Philip's Marsh, 1911, *White Fl.*—Central Europe to N. Asia and Persia.

G. ELEGANS M. Bieb. Bedminster, 1922, *S.* A garden outcast.—Orient.

G. PORRIGENS Boiss. St Philip's Marsh, 1902, *White Fl.* and subsequently. St Anne's, 1905, *White Fl.* Henleaze, 1906, *White Fl.* Portishead Station-yard, 1905-11, *White Fl.*—Orient.

G. MURALIS L. Avonmouth Docks, 1931, *Gibbons.*—Europe, N. Asia and Asia Minor.

SAPONARIA OFFICINALIS L. Cumberland Road, 1889, and subsequently, *White Fl.* Railway bank, Ashley Hill, 1931, *S.* Portishead Station-yard, 1905-7, *White Fl.*—Europe, Orient.

VACCARIA PYRAMIDATA Medik. (SAPONARIA VACCARIA L.). Frequent on corn-siftings and in chicken-runs. Earliest local record, Kingswood, 1880, *White Fl.*—Central Europe, Medit. Reg.

SILENE CUCUBALUS Wibel, var. RUBRA DC. (var. CARNEIFLORA Legr.). St Philip's Marsh, 1916, *Misses Cobbe.*—Europe, Medit. Reg.

S. NOCTIFLORA L. Common. Earliest record, Kingswood, 1882, *White Fl.*—N. and Central Europe, E. Medit. Reg.

S. ANGLICA L. St Philip's Marsh, 1889, *White Fl.* and subsequently. Avonmouth Docks, 1928, *S.*—Europe, Medit. Reg.

*S. QUINQUEVULNERA L. Portishead Station-yard, 1903, *White Fl.*—Medit. Reg.

S. GALLICA L. St Philip's Marsh, 1916, *Misses Cobbe.* Kingswood, 1932, *S.* Wapping Wharf, 1932, *Gibbons.* Shirehampton, 1917, *S.* —Europe, Medit. Reg.

S. DICHOTOMA Ehrh. Rather frequent. Earliest record, Kingswood, 1880, *White Fl.*—E. Europe, Caucasus, Asia Minor.

S. LYDIA Boiss. Baptist Mills, 1926, *S.* First British record.—Asia Minor.

S. CONOIDEA L. St Philip's Marsh, 1904, *White Fl.* and subsequently. Avonmouth Docks, 1928, *S.* Portishead Dock, 1906, *Miss Livett* in *White Fl.*—Medit. Reg.

S. PENDULA L. Waste land, Cranbrook Road, 1928, *S.*—Medit. Reg.

S. MUSCIPULA L. Frequent. Earliest record, St Philip's Marsh, 1904, *White Fl.*—Medit. Reg.

S. STRICTA L. (S. PTEROPLEURA Boiss. et Reut.). Ashton Gate, 1922, *S.* Avonmouth Docks, 1930, *S.*—Medit. Reg.

*LYCHNIS MACROCARPA Boiss. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.*—Medit. Reg.

L. GITHAGO (L.) Scop. Common, especially on corn-siftings.—Europe, Medit. Reg., N. Asia.

CERASTIUM TOMENTOSUM L. Garden outcast. Near Bristol, *Rep. B.E.C.*, 1927.—E. Medit. Reg.

*C. DICHOTOMUM L. St Philip's Marsh, 1916, *Misses Cobbe.*—Spain, N. Africa, E. Medit. Reg.

SPERGULARIA LONGIPES Rouy. Avonmouth Docks, 1931, *Gibbons*.—S. France, Spain, N. Africa.

SPERGULA SATIVA Boenn. Ashton Gate, 1921, *S*.—Europe, Medit. Reg., and introduced all over the world.

PORTULACACEAE.

PORTULACA OLERACEA L. Ashley Hill, 1932, *S*. Avonmouth Docks, 1926, *S*.—Medit. Reg.

*CLAYTONIA PERFOLIATA Don. Waste ground, Redland, 1888, *Thompson* in *White Fl.*—W. North America, Mexico, West Indies.

MALVACEAE.

ALTHAEA HIRSUTA L. St Philip's Marsh, 1915, *Gardner*; 1916, *Misses Cobbe*. Embankment of new road, Ashton Gate, 1906, *White Fl.* Portishead Station, 1903-5, *Miss Peck* in *White Fl.*; 1915, *Miss Roper*.—Central Europe, Medit. Reg.

LAVATERA PUNCTATA All. Bedminster, 1922, *S*. Waste ground, Cranbrook Road, *Alden*. Corn-mill, Portishead Dock, 1906, *White Fl.*—Medit. Reg.

MALVA SYLVESTRIS L., var. *DASYCARPA Beck. St Philip's, 1906, *White Fl.*—? Medit. Reg.

Var. ERIOCARPA Boiss. Corn-mill refuse, Portishead Dock, 1906-11, *White Fl.* Plants with shaggy fruits, referable to one or other of the above varieties, were still at Portishead Dock in 1932, *S*. —E. Medit. Reg.

M. AMBIGUA Guss. Waste ground, Brislington, 1917, *Miss Roper*.—Medit. Reg.

M. PUSILLA Sm. (M. BOREALIS Wallm.). Rather common. Earliest record, St Philip's Marsh, 1902, *White Fl.*—N. Europe, N. Asia.

Var. LASIOCARPA C. E. Salmon. St Werburgh's, 1927-8, *S*.

*M. PARVIFLORA L. St Philip's Marsh, 1900; Wapping Wharf, 1911, *White Fl.* Portishead Station-yard, 1904, *White Fl.*—Medit. Reg.

ABUTILON THEOPHRASTI Med. (A. AVICENNAE Gaertn.). Wapping Wharf, 1911, *Samson* in *White Fl.* St Anne's, 1919, *S*.—Medit. Reg.

HIBISCUS TRIONUM L. St Annes, 1907-8; Wapping Wharf, 1911, *White Fl.* Avonmouth Docks, 1932, *Mrs Jennings* and *Evans*. Cabbage-patch, Portishead, 1906, *White Fl.*—Central Europe, E. Medit. Reg.

TILIACEAE.

CORCHORUS OLITORIUS L. ("False Jute"). Avonmouth Docks, 1932, *Gibbons*, first British record of this genus.—Tropics.

LINACEAE.

LINUM USITATISSIMUM L. Common. With white flowers at Avonmouth Docks, *S*.—Cult.

ZYGOPHYLLACEAE.

TRIBULUS TERRESTRIS L. Portishead Dock, 1931, *Miss Grignon*.—Medit. Reg.

GERANIACEAE.

GERANIUM ENDRESSI Gay. Skirt of Leigh Wood, *White Fl.*—Pyrenees.

ERODIUM MOSCHATUM L'Hérit. Dredgings, Black Rock Quarry, 1883-7, *White Fl.* Wapping Wharf, 1912, and St Philip's Marsh, 1916, *Miss Roper*. Baptist Mills, *S.* Portishead Station-yard, 1906-9, *White Fl.*—Europe, Medit. Reg.

*E. CICUTARIUM L'Hérit., var. PIMPINELLIFOLIUM Sibth. Portishead Station-yard, 1902, *White Fl.*—W. and Central Europe.

E. STEPHANIANUM (Poir.) Willd. Chicken-run, Ashley Hill, 1925, *S.*—N. Asia.

IMPATIENS PARVIFLORA DC. Lane at the back of Clifton College Close, about 1912, *S.* Near the Victoria Rooms, Clifton, *Miss Roper*. Waste ground, Redland, 1924, *Gibbons*.—N. Asia.

I. GLANDULIFERA Royle. Railway bank, Ashley Hill, 1931, *S.* Ashton Gate, 1932, *S.*—Himalayas.

RHAMNACEAE.

RHAMNUS ALATERNUS L. Bushy slope, Clifton Down. Penpole Point, Shirehampton, *Thompson*.—Medit. Reg.

LEGUMINOSAE.

TRIGONELLA FOENUM-GRAECUM L. Brislington, 1912, *Evans*, and subsequently; this is the *T. gladiata* Stev. of *Rep. B.E.C.*, 1917, p. 102, fide sp. in Herb. Evans. St Philip's Marsh, 1916, *Misses Cobbe*. Ashton Gate, 1921, *S.* Wee Lane, 1927, *S.* Eastville, 1920, *Miss Roper*.—Medit. Reg. (native of the Orient).

[T. GLADIATA Stev. Error, see under *T. Foenum-graecum*.]

T. POLYCERATA L. St Philip's Marsh, 1902, *White Fl.*; 1916, *Misses Cobbe*. Ashton Gate, 1922, *S.* Portishead Dock, 1905-7, *White Fl.* Tip at Portishead South, 1914, *S.*—Medit. Reg.

T. MONSPELIACA L. Bedminster, 1922, *S.*—Medit. Reg.

T. CAELESYRIACA Boiss. Bedminster, 1930, *S.* Avonmouth Docks, 1928, *S.*—Orient.

T. CAERULEA Ser. Various localities in *White Fl.*, but the specimens may belong to the much commoner *T. Besseriana*. A plant collected in Portishead Station-yard in 1912, *S.*, is *T. caerulea*.—Central and E. Europe, Orient.

T. BESSERIANA Ser. Frequent.—Central and E. Europe, Orient.

MEDICAGO FALCATA L. Under St Vincent's Rocks, 1835, *Stephen's Cat.* in *White Fl.* St Philip's Marsh, 1895, *Dunn*, and subsequently. Kingswood, 1880-90, *White Fl.* Portishead Dock, 1900-8, *Mrs Gregory* and *Miss Peck*.—Europe, Orient, N. Asia.

Var. TENUIFOLIOLATA Vuyck. St Philip's Marsh, 1913, *S*. Bedminster, *Misses Cobbe* in *Rep. B.E.C.*, 1918. Avonmouth Docks, 1923, *S*.

M. SATIVA L. Common.—Cult.

*M. VARIA Martyn. (? M. FALCATA × SATIVA). St Philip's Marsh, 1916, *Misses Cobbe* and *Druce* in *Rep. B.E.C.*, 1917. See also the record in *White Fl.* of a possible hybrid at Portishead Dock.—W. and Central Europe.

M. HISPIDA Gaertn., var. DENTICULATA (Willd.) G. et G. Rather common. Earliest record, Black Rock Quarry, 1883, *White Fl.*—Britain, France, Medit. Reg.

Var. GRACILLIMA Ten. Kingswood, 1932, *S*.—Medit. Reg.

Var. APICULATA Willd. St Philip's Marsh, 1916, *Misses Cobbe*. Eastville, 1918, *S*. Kingswood, 1932, *S*. Avonmouth Docks, 1926, *S*. Portishead, 1900, *White Fl.*—France, Medit. Reg.

Var. TUBERCULATA G. et G. (var. CONFINIS (Koch) Burnat). Ashton Gate, 1917, *S*. Avonmouth Docks, 1926, *S*.—France, Medit. Reg.

Var. LAPPACEA (Desr.). Ashton Gate, 1917, *S*.—Medit. Reg.

M. ARABICA Huds. Rather common.—W. Europe, Medit. Reg.

*M. MINIMA (L.) Desr. Dredgings in Black Rock Quarry, 1883, *White Fl.* St Philip's Marsh, 1895, *Bucknall* in *White Fl.*—Europe, Medit. Reg.

M. LUPULINA L., var. WILLDENOWIANA Koch. Portishead Station-yard, 1900, *White Fl.* Railway-sidings, Shirehampton, 1917, *S*.—Europe, Asia, N. Africa.

M. ORBICULARIS All. St Philip's Marsh, 1916, *Green*; 1922, *S*.—Medit. Reg.

*M. MARGINATA Willd. St Philip's Marsh, 1904, *White Fl.*—Medit. Reg.

*M. SCUTELLATA Mill. St Philip's Marsh, 1904, *White Fl.*—Medit. Reg.

M. OBSCURA Retz., sub-sp. HELIX (Willd.) Fiori et Paol., var. SPINULOSA Guss. St Philip's Marsh, 1915-16, *S*.—Medit. Reg.

M. TRIBULOIDES Desr. St Philip's Marsh, 1922, *S*.—Medit. Reg.

Var. *TRUNCATULA (Gaertn.) Koch. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1919.—Medit. Reg.

M. TURBINATA Willd. St Philip's Marsh, 1916 (var. *breviseta* Rouy et Fouc.), *Green* and *S*. Portishead Station-yard, 1906-7, *Miss Livett* in *White Fl.*—Medit. Reg.

*M. RIGIDULA Desr. St Philip's Marsh, 1902, *White Fl.*—Medit. Reg.

M. CILIARIS Krocker. St Philip's Marsh, 1922, *S*. Avonmouth Docks, 1932, *Gibbons*.—Medit. Reg.

MELILOTUS ALTISSIMA Thuill. (M. OFFICINALIS of *White Fl.*). Common.—Europe, Asia.

M. ALBA Desr. Frequent.—Europe, Asia.

M. ARVENSIS Wallr. Common.—Europe, Asia.

M. INDICA (L.) All. Common now, though noted as rare in *White Fl.*—Medit. Reg.

Var. EXALTATA Biv. Bristol, *Druce* in *Rep. B.E.C.*, 1927.

M. SICULA Jackson. (M. MESSANENSIS All.). Avonmouth Docks, 1932, *Gibbons*.—Medit. Reg.

M. SULCATA Desr. Bedminster, 1930, *S.*—Medit. Reg.

TRIFOLIUM PRATENSE L., var. AMERICANUM Hartz. Avonmouth Docks, 1923, *S.*—Central Europe, E. Medit. Reg. (introduced into America).

T. INCARNATUM L. Roadside waste, Sea Mills, 1898, *White Fl.* By railway, Ashton Gate, *White Fl.* Clifton Downs, 1914, *S.*; this appeared for a few years after the Royal Show.—Medit. Reg., Cult.

T. ARVENSE L. Colliery waste, Kingswood; garden weed, Ashley Down (*Alden*); and Baptist Mills, 1911 (*Evans*), *White Fl.*—Europe, N. Asia, N. Africa.

Var. STRICTIUS Koch. Avonmouth Docks, *Evans* in *Rep. B.E.C.*, 1931.

T. HYBRIDUM L. Common.—Europe, Medit. Reg.

Var. ELEGANS (Savi) Garcke. Occasional.—Europe, Medit. Reg.

T. GLOMERATUM L. Wee Lane, 1922, *S.*—Britain, France, Medit. Reg.

T. AGRARIUM L. Railway siding between Shirehampton and Avonmouth, 1918, *S.*—Europe, Medit. Reg.

T. PROCUMBENS L., var. MAJUS Koch. Avonmouth Docks, 1910, *White Fl.*—Europe, Medit. Reg.

T. LAPPACEUM L. St Philip's Marsh, 1915-16, *Druce* and others. Chicken-runs, Wee Lane and Baptist Mills, 1922-27, *S.*—Medit. Reg.

T. ANGUSTIFOLIUM L. Ashton Gate, 1918, *Misses Cobbe.* Baptist Mills, 1927, *S.*—Medit. Reg.

T. PURPUREUM Lois. Baptist Mills, 1926, *S.*—Medit. Reg.

*T. CONSTANTINOPOLITANUM Ser. (T. ALEXANDRINUM L.). St Philip's, *Misses Cobbe* in *Rep. B.E.C.*, 1919.—E. Medit. Reg.

T. ECHINATUM M. Bieb. (T. SUPINUM Savi). Fowl-run, Baptist Mills, 1911, *Miss Roper* in *White Fl.*; 1926, *S.*—E. Medit. Reg.

T. DIFFUSUM Ehrh. Wee Lane, 1924, *Gibbons* and *S.* Ashton Gate, 1922, *S.*—Medit. Reg.

T. RESUPINATUM L. Earliest record for Britain, *T. B. Flower* (1854), in marshes below Shirehampton, 1830, see *White Fl.* Near the Lamplighters, Shirehampton, 1912, *S.* Frequent in the area as a grain alien.—Medit. Reg.

T. TOMENTOSUM L. Chicken-run, Wee Lane, 1922 and 1927, *S.*—Medit. Reg.

*T. SPUMOSUM L. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1916.—Medit. Reg.

T. VESICULOSUM Savi. Tip at Portishead South, 1914, *S.*—Medit. Reg.

*T. ANGULATUM W. et K. Ashton Gate, *Misses Cobbe* in *Rep. B.E.C.*, 1918.—Hungary, Balkan Peninsula.

*T. NIGRESCENS Viv. Portishead, 1916. *Miss Livett* ex *White.*—Medit. Reg.

T. ISTHMOCARPUM Brot. Baptist Mills, 1920, and subsequently, *S.*—Medit. Reg.

T. ALBIDUM Retz. Chicken-run, Wee Lane, 1922, *S.*—Medit. Reg.

LOTUS TENUIS W. et K. Waste ground, Cranbrook Road, 1917, *H. S. Thompson.*—Europe, Medit. Reg.

GALEGA OFFICINALIS L. Brislington, 1916, *Misses Cobbe.* Cranbrook Road, 1925, *Gibbons.* Avonmouth Docks, 1923, *S.*—Medit. Reg.

COLUTEA ARBORESCENS L. Waste ground, Kingswood, 1932, *S.*—Central Europe, Medit. Reg.

ASTRAGALUS BOETICUS L. St Philip's Marsh, 1915, *Green* and *S.* Redland, 1932, *Gibbons.*—Medit. Reg.

A. STELLA DC. Bedminster, 1930, *S.*—Medit. Reg.

SCORPIURUS SUBVILLOSA L. Cultivated land, Wee Lane, Eastville, 1911, *Miss Roper.*—Medit. Reg.

CORONILLA VARIA L. First record, on dredgings, Black Rock Quarry, 1884-5, *White Fl.* An alien of increasing frequency, *White Fl.* Established in Portishead Dock and in Avonmouth Docks, 1932, *S.*—France, Central Europe, Medit. Reg.

C. SCORPIOIDES Koch. St Philip's Marsh, 1916, *Misses Cobbe.* Ashton Gate, 1917, *S.* Bedminster, 1930, *S.* Cranbrook Road, 1925, Gibbons.—Medit. Reg.

*ORNITHOPUS COMPRESSUS L. St Philip's Marsh, 1902-4, *White Fl.*—Medit. Reg.

*O. SATIVUS Brot. Railway-bank, Brentry, 1909, *Miss Roper* in *White Fl.*—Iberian Peninsula, N. Africa.

ONOBRYCHIS VICIAEFOLIA Scop. (O. SATIVA Lam.). Railway banks, Ashley Hill, *White Fl.*; established, 1932, *S.*—Europe, N. Asia, Medit. Reg.

CICER ARIETINUM L. St Philip's Marsh; Brislington, 1916, *Misses Cobbe.* Eastville, 1918, *Miss Roper.* Avonmouth Docks, 1924, *S.*—Orient, Cult.

*VICIA TENUIFOLIA Roth. Bedminster, 1911, *White Fl.*—Europe, N. Asia, Medit. Reg.

V. VILLOSA Roth. St Philip's Marsh, 1902; Clifton, from barley siftings, 1903, *White Fl.* Now frequent, Bristol, Avonmouth and Portishead.—Europe, Medit. Reg.

V. DASYCARPA Tenore. (V. VARIA Host). St Philip's Marsh, 1902; Portishead, 1904, *White Fl.* Brislington, 1917, *S.* Avonmouth Docks, 1928, *S.* and *Gibbons.* St Philip's, 1916, *Misses Cobbe.*—Medit. Reg.

V. BITHYNICA L. Casual near the corn-mill by Portishead Station, 1900, *Mrs Gregory* in *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Ashton Gate, 1922, *S.*—England, Medit. Reg.

V. LUTEA L. On dredgings from the Avon and Floating Harbour deposited in the Black Rock Quarry, 1883-4; waste ground, St

Philip's, 1902-5, *White Fl.* Portishead Station-yard, 1900-7, *White Fl.* Baptist Mills, 1922, *S.*—Britain, Medit. Reg.

Var. CAERULEA Archang. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1919. Ashton Gate, 1924, *S.*—Medit. Reg.

V. HYBRIDA L. Waste ground, St Philip's, 1902; Portishead Station sidings, 1904, *White Fl.* Brislington (St Anne's), 1919, *S.*—Medit. Reg.

V. SATIVA L. St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, *S.* Frequent.—Europe, Medit. Reg.

Forma ALBA. Railway siding between Shirehampton and Avonmouth, 1914, *S.*

*Var. MACROCARPA Moris. Allotment, Horfield, 1922, *Gibbons*, det. *H. S. Thompson* in *White Notes* in *Proc. Brist. Nat. Soc.*, 1922.—Medit. Reg.

V. ANGUSTIFOLIA Reich. A prostrate form is frequent on rubble, *e.g.* Stapleton Road Gas Works, 1911; Avonmouth Docks, 1928, *S.*—Europe, Medit. Reg.

V. BENGHALENSIS L. (V. ATROPURPUREA Desf.). Eastville, 1921; Avonmouth Docks, 1930, *S.*—Medit. Reg.

[V. MONANTHOS Desf. St Philip's Marsh, 1916, *Misses Cobbe.* This was the *V. calcarata* Desf. of *Rep. B.E.C.*, 1919.]

V. CALCARATA Desf. St Philip's Marsh, 1916, *Misses Cobbe*, as *V. monanthos*, *Rep. B.E.C.*, 1919. St Philip's Marsh, 1922, *S.* Avonmouth Docks, 1930, *S.*—Medit. Reg.

V. FABA L. Common.—Cult. (native of Orient and N. Africa).

V. NARBONENSIS L. Bristol, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Eastville, 1921, *S.* Cranbrook Road, 1927, *Gibbons.*—Medit. Reg.

Var. SERRATIFOLIA Koch. Ashton Gate, 1922, *S.*—Medit. Reg.

V. PANNONICA Crantz. Bristol, *White Fl.* Ashton Gate, 1922, *S.* Avonmouth Docks, 1932, *Gibbons.*—Medit. Reg.

Var. STRIATA (M. Bieb.) Griseb. (V. PURPURASCENS DC.). Brislington, 1916, *Miss Roper.*—Medit. Reg.

*V. MELANOPS Sibth. et Sm. Bristol, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.*—Medit. Reg.

V. PEREGRINA L. Cranbrook Road, 1927, *Gibbons.*—Medit. Reg.

V. cf. HOOKERI G. Don. (V. MICRANTHA H. et A.). Avonmouth Docks, 1930, *S.*—Temp. S. America.

*V. VESTITA Boiss. Cranbrook Road, 1927, *Gibbons.*—W. Medit. Reg.

*V. HYRCANICA Fisch. et Mey. Bristol, *White Fl.*—Caucasus.

*LENS NIGRICANS Gren. Eastville tips, 1917, *Miss Roper* in *White Notes Suppl. Fl.*—Medit. Reg.

LATHYRUS LATIFOLIUS L. Established on the cliff, Sea Walls, Durdham Downs, *White Fl.*—Central Europe, Medit. Reg.

L. HIRSUTUS L. *Herb. St Brody*, "Reported from Bristol, 1854," *White Fl.* On rubbish by the Avon, Brislington, 1912, *White Notes Suppl. Fl.* Eastville tip, 1916, *S.* and *Green.*—Central Europe, Medit. Reg.

L. APHACA L. Bedminster, 1828, *Rootsey's List*; St Philip's Marsh, 1902, *White Fl.* St Anne's, 1907, *Miss Edmonds* in *White Fl.* St Philip's Marsh, 1914, *Green.* Shirehampton, 1914, *S.* and *Green.* Avonmouth Docks, *S.*—Europe, Medit. Reg.

L. INCONSPICUUS L. Ashton Gate, 1922, *S.*—Medit. Reg.

L. ANNUUS L. "Near the Docks." *White Fl.* St Anne's, 1913, *Evans.* Avonmouth Docks, 1930, *S.*—Medit. Reg.

L. CICERA L. "Near the Docks," *White Fl.* Bedminster, 1922, *S.* Avonmouth Docks, 1930, *S.*—Medit. Reg.

L. SATIVUS L. St Anne's, 1913, *Evans.* Eastville tips, 1917, *Miss Roper.* Avonmouth Docks, 1928, *S.*—Medit. Reg.

*L. HIEROSOLYMITANUS Boiss. St Philip's Marsh, 1916, *Misses Cobbe.*—Orient.

L. CLYMENUM L. Avonmouth Docks, 1930, *S.*—Medit. Reg.

L. OCHRUS L. Portishead Station-yard, 1909, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Bedminster, 1922, *S.* Avonmouth Docks, *S.*—Medit. Reg.

PISUM ARVENSE L. St Philip's Marsh, 1916, *Misses Cobbe.* Wapping Wharf, 1931, *Evans.* Avonmouth Docks, 1929, *S.*—Cult.

*P. HUMILE Boiss. et Noe. St Philip's Marsh, 1916, *Misses Cobbe.*—Orient.

P. SATIVUM L. Common. Avonmouth Docks, 1929, *S.*—Cult.

GLYCINE SOJA S. et Z. Avonmouth Docks, 1923, *S.*; frequent to 1930. —E. Asia.

ROSACEAE.

FRAGARIA CHILOENSIS Duchesne. Avon bank, until the construction of Portway.—S. America.

POTENTILLA ARGENTEA L. Siding at Portishead Station, 1912, *White Notes Suppl. Fl*—Europe, W. Asia, N. America.

P. NORVEGICA L. "An alien; one . . . that we are likely to have always with us," *White Fl.* Baptist Mills, 1911, *Miss Roper.* Portishead Dock, 1903, *White Fl.* Avonmouth Docks, *S.* A common Bristol alien.—N. Europe, N. Asia, N. America.

P. RECTA L. Portishead Station sidings, 1903-5, *White Fl.* On a wall, Clifton, 1912, *S.* Fowl-run, Bristol, *Gibbons.*—Central Europe, Medit. Reg.

P. INTERMEDIA L. Wee Lane, *Gibbons.* Avonmouth Docks, 1931-2, *S.*, *Gibbons* and *Evans.*—N. Europe.

POTERIUM POLYGAMUM W. et K. (P. MURICATUM Spach). Bank of the Port and Pier railway between Sea Mills and Shirehampton, and railway bank near the Boiling Well, *White Fl.*—Central Europe, Medit. Reg.

COTONEASTER MICROPHYLLA Wallich. The Gully near Sea Walls, *White Fl.*—Himalayas.

LYTHRACEAE.

LYTHRUM HYSSOPIFOLIA L. St Philip's Marsh, 1914, *S.* and *Green.* Bedminster, 1930; Ashley Hill, 1931, *S.*—Central Europe, Medit. Reg., widely introduced.

L. MEONANTHUM Link. (L. GRAEFFERI Ten.). St Philip's Marsh, 1915, *S.* and *Green.* Brislington, 1920; Baptist Mills, 1925-30, *S.*—Medit. Reg.

ONAGRACEAE.

EPILOBIUM ANGUSTIFOLIUM L., E. HIRSUTUM L., E. TETRAGONUM L., E. OBSCURUM Sch., E. ROSEUM Sch., E. MONTANUM L. and E. LAMYI F. Sch. have all appeared as casuals on the Port and City tips. E. LANCEOLATUM Seb. et Maur., on rubbly banks between Shirehampton and Avonmouth (probably native), *S.*—British and European natives.

OENOTHERA BIENNIS L. Railway banks, Bristol. 1867, *White Fl.* Common.—America.

OE. ODORATA Jacq. Brislington, 1907, *White Fl.* St Anne's, 1932. *Evans.*—Temp. S. America.

OE. SINUATA L. (OE. LACINIATA Hill). Bedminster, 1922, *S.* Boiling Wells, 1919, *Mrs Wedgwood.* Ashley Hill, 1927, *S.*—N. America.

OE. ARGENTINA Lévl. et Thell. Avonmouth Docks, 1923-1928, *S.* This is the *Oe. catherinensis* Camb. of *Rep. B.E.C.*, 1924, 436.—Temp. S. America.

LOASACEAE.

MENTZELIA ALBICAULIS Dougl. Ashton Gate, 1917, *S.*—Western N. America.

UMBELLIFERAE.

*BUPLEURUM ROTUNDIFOLIUM L. On rubbish in St Philip's Marsh, 1891, and subsequently, *White Fl.*—Europe, Medit. Reg.

B. LANCIFOLIUM Hornem. (B. PROTRACTUM H. et L.). St Philip's Marsh and Portishead Station-yard, 1906-7, *White Fl.* Frequent.—Medit. Reg.

B. FONTANESII Guss. St Philip's Marsh, 1911, *Miss Roper*; this is the *B. aristatum* Bartl. of *White Fl.*, 338. Tip at Eastville, 1916, *Miss Roper.*—Medit. Reg.

APIUM LEPTOPHYLLUM (Pers.) F. Muell. ex Benth. (A. TENUIFOLIUM (Moench) Thellung). Bedminster, 1918, *Misses Cobbe.* Portishead Dock, 1922, *S.* According to Dr T. A. Sprague, *A. tenuifolium* (Moench) Thellung is a combination which is based on an illegitimate name and therefore cannot be used.—Widely spread over Central and S. America and S. United States, see Sprague in *Journ. Bot.*, 1923, 129-133.

AMMI MAJUS L. St Philip's Marsh, 1916, *Misses Cobbe.* Baptist Mills. 1918, *S.* Ashley Hill, 1922, *Gibbons.*—Medit. Reg.

Var. GLAUCIFOLIUM (L.) Noul. Brislington, 1923, *S.* Baptist Mills. 1926, *S.*—Medit. Reg.

A. VISNAGA Lam. St Philip's Marsh, 1914, *Green*. Baptist Mills, 1917. *S*. Avonmouth Docks, 1928. *S*. and *Gibbons*.—Medit. Reg.

CARUM CARVI L. St Philip's Marsh, 1905, *Miss Roper*. By Hotwells Station, 1911, *Noel Sandwith* in *White Fl*. Mentioned in a list of Bristol plants of date about 1830, *White Fl*. Ashton Gate, 1922, *S*. Baptist Mills; Avonmouth Docks, *S*.—Europe, Temp. Asia.

C. PETROSELINUM (L.) B. et H. (P. HORTENSE Hoffm. = SATIVUM Lam.). Abundant on St Vincent's Rocks from a remote period. The figure in *Eng. Bot. Suppl.* was drawn from a Clifton specimen, *White Fl*.—Medit. Reg. and Cult.

C. AROMATICUM (L.) Dr. (C. COPTICUM B. et H., TRACHYSPERMUM AMMI (L.) Sprague et Turrill). Eastville, 1921. *S*.—Egypt, Orient.

RIDOLFIA SEGETUM Moris. Baptist Mills, 1917. *S*.—Medit. Reg.

*PIMPINELLA ANISUM L. St Philip's Marsh, 1916, *Druce* and *Misses Cobbe* in *Rep. B.E.C.*, 1919. Bristol, 1932, *Gibbons*.—E. Medit. Reg.

SCANDIX PECTEN-VENERIS L. Common.—Europe, Medit. Reg.

*S. AUSTRALIS L. St Philip's Marsh, *Rep. B.E.C.*, 1916, *Misses Cobbe* and *Druce*.—Medit. Reg.

SCANDICIUM PINNATIFIDUM (Vent.) Thell. Brislington, 1921, *Evans*.—Medit. Reg.

S. IBERICUM (M. Bieb.) Thell. Brislington, 1913, *Evans*. St Philip's Marsh, 1915; Ashton Gate, 1917, *S*.—E. Medit. Reg.

CHAEREFOLIUM ANTHRISCUS (L.) Lam. St Philip's Marsh, *Herb. Stephens*; Portishead Station-yard, 1909-10, *White Fl*. Avonmouth Docks, 1932, *S*.—Europe, Medit. Reg.

*C. CEREFOLIUM (L.) Schinz et Thell. (CHAEROPHYLLUM SATIVUM Bess.). Casual at Knowle, 1880, *Painter* in *White Fl*.—Central Europe, E. Medit. Reg.

FOENICULUM VULGARE Mill. St Philip's Marsh; on the new railway from Avonmouth; railway and Corn-mill, Portishead, *White Fl*. Frequent.—Central Europe, Medit. Reg.

*F. PIPERITUM All. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce*.—Medit. Reg.

*OENANTHE PIMPINELLOIDES L. and OE. FISTULOSA L., recorded as aliens found in St Philip's Marsh by the *Misses Cobbe, Rep. B.E.C.*, 1916.—Europe, Medit. Reg.

*CAPNOPHYLLUM PEREGRINUM (L.) Lange. St Philip's Marsh, *Misses Cobbe* and *Druce* in *Rep. B.E.C.*, 1917. Already recorded in the *Brit. Pl. List*, 32, as *C. dichotomum*.—Medit. Reg.

ANETHUM GRAVEOLENS L. Eastville, 1917; Brislington, 1917, *S*. St Anne's, 1924, *Gibbons*. Avonmouth Docks, *S*. A frequent casual during the Great War, the seeds being used as a substitute for Caraway.—Medit. Reg.

*HERACLEUM MANTEGAZZIANUM S. et L. As H. GIGANTEUM Fisch., Montpelier Station, *White Fl*.—Caucasus.

CORIANDRUM SATIVUM L. St Philip's Marsh, 1916, *Misses Cobbe* and *S.* Eastville and Brislington, 1915, *White Notes Suppl. Fl.* Bedminster, 1931, *S.*; 1932, *Evans.*—Medit. Reg.

BIFORA RADIANS M. Bieb. Avonmouth Docks, 1932, *Gibbons* and *Evans.* —Medit. Reg.

B. TESTICULATA Roth. St Philip's, 1904; and in Portishead Station-yard, 1906, *White* Fl. Waste ground, Ashton Gate, 1917, *S.*—Medit. Reg.

DAUCUS MURICATUS L. Fowl-run, Wee Lane, 1922, *S.*—W. Medit. Reg.

CAUCALIS LEPTOPHYLLA L. St Philip's Marsh, 1903; Portishead Station-yard, 1905, introduced with imported grain, *White Fl.* Bedminster, 1922; Baptist Mills, *S.* Avonmouth Docks, 1931, *Gibbons.*—Medit. Reg.

C. DAUCOIDES L. By the Avon, 1903; Cumberland Basin, 1906, *C. Wall*; on corn-mill refuse, Portishead station-yard, 1902-1907, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Ashton Gate, 1922, *S.* Baptist Mills, 1922, *S.* Frequent at Avonmouth Docks, *S.* —Europe, Medit. Reg.

Var. MURICATA (Bishoff) G. et G. Railway siding between Shirehampton and Avonmouth, July 1922, *N. Sandwith*, see *Rep. B.E.C.*, 1924.—Mainly Central Europe.

*TORILIS INFESTA Spreng. Kingswood, 1882; Montpelier; on mill refuse, Portishead, *White Fl.*—Europe (mainly Central and S.), Medit. Reg.

T. NODOSA (L.) Gaertn. Frequent, *White Fl.* St Philip's Marsh, 1915; Avonmouth Docks, *S.*—Europe, Medit. Reg.

Var. PEDUNCULATA Rouy and Foucaud. St Philip's Marsh, 1916, *S.* Avonmouth Docks, 1928, *Miss Roper.*

TURGENIA LATIFOLIA (L.) Hoffm. St Philip's Marsh, 1901; Harbour railway by the Ferry, 1903; Cumberland Basin, 1905, *C. Wall*; Baptist Mills, 1911, *Evans*, *White Fl.* Avonmouth Docks, 1927, and subsequently, *S.*—Central Europe, Medit. Reg.

CAPRIFOLIACEAE.

SAMBUCUS EBULUS L. Troopers' Hill, *Herb. Stephens* in *White Fl.* and still established there.—Europe, Medit. Reg.

RUBIACEAE.

GALIUM TRICORNE Stokes. Waste ground, St Philip's, 1904; Kingswood, 1880-6; Stapleton Road Gas Works, 1911, *S.*, *White Fl.*—Europe, Medit. Reg.

G. SPURIUM L., var. VAILLANTII DC. St Philip's Marsh, 1904, *White Fl.*, and subsequently. Kingswood, 1932, *S.*—Europe, Medit. Reg.

ASPERULA ARVENSIS L. St Philip's Marsh, 1900-11, *White Fl.* and subsequently. Portishead Station-yard, 1904-9, *White Fl.* Avonmouth Docks, 1930, *S.*—Central Europe, Medit. Reg.

VALERIANACEAE.

Kentranthus ruber (L.) Dr. Thoroughly established on cliffs, old walls, and rocky banks about Clifton and Bristol, *White Fl.*—Medit. Reg.

*Valerianella eriocarpa Desv. Casual at St Philip's, 1904, *C. Bucknall* in *White Fl.*—S.W. England, France, Medit. Reg.

V. discoidea Loisel. St Philip's Marsh, 1916, *S.*—Medit. Reg.

DIPSACACEAE.

Dipsacus sativus (L.). (D. Fullonum auct.). Horfield, *Herb. Stephens*; Roman Camp, Leigh Woods, 1853, *Herb. Flower*, *White Fl.* St Philip's Marsh, 1915; fowl-run, Baptist Mills; waste ground. Ashley Hill, 1931, *S.*—Cult.

Cephalaria syriaca (L.) Schrad. Avonmouth Docks, 1931, *S.*—Medit. Reg. (mainly Orient).

COMPOSITAE.

Grindelia squarrosa Dunal. On old colliery rubble (near) Kingswood. 1880, *White Fl.* St Philip's Marsh, 1915, *Green*, *Miss Roper*, *S.* Bedminster, 1922, *S.*—N. America, Mexico.

Erigeron canadensis L. St Vincent's Rocks, *Withering* (1796) and *Rootsey* in 1828; Crews Hole, *Stephens*; The New Cut, *Swete Fl.*; Bristol Harbour, and Ashton Avenue, 1911, *Miss Roper* in *White Fl.* Increasingly abundant, Avonmouth and Portishead Docks, *S.*—N. America, and widely naturalised in many countries.

E. acris × canadensis L. = E. Hulsenii Kerner. Ashton Gate, 1911, *Miss Roper* in *White Fl.* Seen there subsequently on numerous occasions, *S.*—This rare hybrid has occurred in sandy fields in Surrey and Suffolk (Icklingham, 1926, *S.*).—Central Europe.

E. crispus Pourr. (E. linifolius Willd.). Avonmouth Docks, 1926-7, *S.* and *Gibbons*.—Medit. Reg.

Filago arvensis L. Avonmouth Docks, 1931-2, *S.*, *Gibbons*, *Evans*.—France, Central Europe, Medit. Reg.

Antennaria margaritacea (L.) R. Br. By the G.W.R. near Fox's Wood quarries, Brislington, 1892, and later, *White Fl.*—N. America, N.E. Asia.

Iva xanthifolia Nutt. Wee Lane, 1924, *Gibbons*.—N. America.

Ambrosia artemisifolia L. Cranbrook Road, 1924, *Gibbons*. Railway siding between Shirehampton and Avonmouth, 1919, *S.* Portishead Dock, 1900-7, *White Fl.*—N. America.

A. psilostachya DC. Waste ground, Brislington, 1917, *S.* and *Green*. —N. America.

A. trifida L. Shirehampton, 1917, *S.* Long Ashton, 1916-17, *Miss Roper* in *White Notes Suppl. Fl.* Avonmouth Docks, 1925, *S.*; 1929, *Gibbons*. Frequent.—N. America.

Var. integrifolia Torr. et Gray. Brislington, 1917, *S.* Bedminster, 1930, *S.*

Xanthium Strumarium L. St Philip's Marsh, 1916, *Miss Roper, Green.* St Anne's, 1917; Bedminster, 1921, *S.* Avonmouth Docks, frequent, *S.* and *Gibbons.*—Europe, Medit. Reg., Siberia.

X. italicum Moretti. Bedminster, 1928, *S.*—Medit. Reg. (mainly Italy).

X. spinosum L. Black Rock Quarry, 1884; St Philip's Marsh, 1900-1; Station-yard, Portishead, 1905-7, *White Fl.* St Philip's Marsh, 1914; Ashton Gate, 1932, *S.* Avonmouth Docks, 1926, *Gibbons,* and subsequently.—E. Europe, Medit. Reg.

X. chinense Miller (= X. occidentale Bert.). Avonmouth Docks, 1931, *S.* and *Gibbons.*—Bermuda, W. Indies, Venezuela.

*Rudbeckia hirta L. Mule Camp near Bristol (v.-c. 6), 1917, *Miss Roper.*—N. America.

Lepachys columnaris Torrey et Gray. On remount ground, Bristol (v.-c. 6), 1917, *Miss Roper.* Avonmouth Docks, 1930, *S.*—N. America.

*Helianthus decapetalus L. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.*—N. America.

*H. petiolaris Nutt. Avonmouth Docks, 1923, *Miss Roper.*—N. America.

*H. annuus L. Avonmouth Docks, 1928, *Gibbons.*—N. America, Mexico.

*H. giganteus L. St Philip's Marsh, 1916, *Miss Roper.*—N. America.

H. rigidus Desf. Avonmouth Docks, 1931, *S.*—N. America.

[Spilanthes decumbens (Sm.) Moore, var. leptophylla (DC.) Moore, det. *Thellung.* St Philip's Marsh, 1917, *Sandwith* in *Rep. B.E.C.*, 1917, but no specimen exists in Herb. Sandwith. Doubtful as a Bristol plant.—Temp. S. America.]

*Simsia foetida (Cav.) Blake. (Encelia mexicana Mart.). St Philip's Marsh, 1900, *White Fl.*—Mexico, Guatemala.

*Verbesina enceloides B. et H. St Philip's Marsh, 1916, *Misses Cobbe.*—N. America, Mexico.

Guizotia abyssinica Cass. Bristol, 1917, *Miss Roper.* Eastville, 1917, *S.* Cranbrook Road, 1926, *Gibbons.* Avonmouth Docks, *S.* Rather common.—Abyssinia (cultivated in India).

*Coreopsis aristosa Michx. St Philip's Marsh, 1900, *C. Bucknall* in *White Fl.*—N. America.

C. tinctoria Nutt. Avonmouth Docks, 1922, *Miss Roper*; 1928, *S.*—N. America.

Bidens pilosa L. St Anne's, 1920; Avonmouth Docks, 1930, *S.*—N., Central and S. America, West Indies.

B. frondosa L. Eastville, 1918, *Miss Roper*; 1921, *S.* Wee Lane, 1927, *Gibbons.* Cranbrook Road, 1928, *S.*—N. America.

Galinsoga parviflora Cav., var. adenophora Thellung. Avonmouth Docks, 1927, *S.* in *Rep. B.E.C.*, 1927, as " Bristol, E. Gloster." —Tropical America.

Madia glomerata Hook. Bedminster, 1923, *S.* and *Gambier-Parry.* Erroneously recorded as *M. sativa* in *Rep. B.E.C.*, 1923.—N. America.

HEMIZONIA PUNGENS Torrey et Gray. Ashton Gate, 1917; Baptist Mills, 1925, and after, *S.* St Philip's Marsh, *Misses Cobbe.* Cranbrook Road, 1928, *Gibbons.* Avonmouth Docks, *S.*—N. America.

H. KELLOGGII Greene. St Philip's Marsh, 1916, *Misses Cobbe* and *T. H. Green.* Ashton Gate, 1922, *S.* Railway siding between Shirehampton and Avonmouth, 1917, *S.*—N. America.

SCHKUHRIA ISOPAPPA Benth. (S. ADVENA Thell.). Waste ground, Wee Lane, 1917, *S.*; Baptist Mills, 1926, *S.* Thellung distinguished his *S. advena* from all other species of the genus by the blunt exaristate scales of the pappus; but this is the very character which distinguishes *S. isopappa,* and Thellung can scarcely have read Bentham's description. Subsequently he admitted the affinity, see Hegi, Flora von Mittel-Europa, vii., 211 in obs. The above specimens agree with the type of *S. isopappa* at Kew. —West Trop. S. America.

S. ABROTANOIDES Roth? (? = S. BONARIENSIS H. et A.). St Philip's Marsh, 1900, *White Fl.* Waste land, Avonmouth, 1932, *Evans.* These plants have aristate pappus-scales. But Roth's description speaks of the scales as "obtuse, incise-ciliate." Perhaps, therefore, *S. abrotanoides* Roth is conspecific with *S. isopappa* Bth.—S. America.

TAGETES MINUTA L. Wee Lane, 1922, *S.* Avonmouth Docks, 1926, *S.* and *Gibbons.*—S. America.

ANACYCLUS CLAVATUS Pers. St Philip's Marsh, 1919, *Druce;* and 1922, *S.* Bedminster, 1926, *S.*—Medit. Reg.

A. RADIATUS Lois. On city rubbish, St Philips, 1899, and after; and on corn-mill refuse by Portishead Dock, *White Fl.* Wee Lane, 1922; Ashley Hill, 1931, *S.*—Medit. Reg.

Var. OCHROLEUCUS Ball. Baptist Mills, 1925, *S.*—N. Africa.

A. VALENTINUS L. St Philip's Marsh, and St Anne's, 1922, *S.* Bedminster, 1926, *S.* Eastville, *S.* Avonmouth Docks, 1928, *Gibbons.*—W. Medit. Reg.

[A. DISSIMILIS Pomel. Bristol, W. Glos., *S.*, see *Rep. B.E.C.*, 1923.

A. PROSTRATUS Pomel. Bristol, W. Glos., *S.*, see *Rep. B.E.C.*, 1923. No specimens of these two species exist in my Herbarium, and they should be excluded in the absence of further evidence. They are rare natives of N. Africa, and are not represented at Kew.]

*ACHILLEA MILLEFOLIUM L., var. LANATA Koch. Bristol, W. Glos., 1927, *Druce.*—Central Europe, Medit. Reg.

A. NOBILIS L. Kingswood, on old colliery waste, 1879; St Philip's Marsh, yearly from 1902-12, *White Fl.*, and subsequently. Avonmouth Docks, 1931-2, *S.*, *Evans, Gibbons.*—Central Europe, Medit. Reg., Siberia.

A. TOMENTOSA L. Kingswood, no date, *Herb. Gibbons.*—Central and S. Europe, Siberia.

ANTHEMIS TINCTORIA L. Kingswood; St Philip's Marsh, 1888-1902; Portishead Station-yard, 1907, *White Fl.* St Philip's, 1916, *Misses Cobbe.* St Anne's, 1924, *S.* Avonmouth Docks, 1932, *S.* and *Evans.*—Europe, Medit. Reg., Siberia.

*A. NOBILIS L. Waste ground, Bristol, 1881, *White Fl.*—Britain, France, Iberian Peninsula, N. Africa.

A. ARVENSIS L. St Philip's Marsh, 1901-4; Kingswood; Portishead, 1902, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.*—Europe, Medit. Reg.

A. COTULA L. Baptist Mills, 1922; Avonmouth Docks, 1930, *S.*—Europe, Medit. Reg.

A. COTA L. (COTA ALTISSIMA L.). St Philip's Marsh, 1919, *Druce.* Baptist Mills, 1925, *S.* Avonmouth Docks, 1929, *S.*—Medit. Reg.

A. TRIUMFETTI All. (COTA TRIUMFETTI Gay). Between Shirehampton and Avonmouth, 1916, *S.*—Central Europe, Medit. Reg.

A. RUTHENICA M. Bieb. Wee Lane, 1924; Portishead Dock, 1923; Avonmouth Docks, 1929, *S.*—Central and E. Europe, W. Asia.

*A. WIEDEMANNIANA F. et M. St Philip's, Bristol, 1911, *J. W. White.*—A native of Asia Minor; also adventive in Germany, *Thellung* in *Rep. B.E.C.*, 1917, 229.

A. MIXTA L. St Anne's, 1922, *S.* Baptist Mills, 1925, *S.*—Central Europe, Medit. Reg.

CHRYSANTHEMUM SEGETUM L. Ashley Hill, *W. E. Green*; Baptist Mills, 1911; sparingly in St Philip's Marsh from year to year; bank of the Avon, Leighside, 1833, *Herb. Powell*; sidings in Portishead Station-yard for many years past, *White Fl.* Frequent. A rayless form occurred at Ashton Gate, 1922, and at Baptist Mills, 1925, *S.*—Europe, Medit. Reg.

C. CORONARIUM L. On rubbish-tips, St Philip's Marsh, Portishead Dock, and Baptist Mills, 1911 (*Evans*), *White Fl.* St Anne's, 1923, *Gibbons.* Avonmouth Docks, 1931, *S.*—Medit. Reg.

MATRICARIA SUAVEOLENS (Pursh) Buch. (M. DISCOIDEA DC.). Common everywhere, see *White Fl.*; first record, St Philip's Marsh, 1902. —N. America.

M. OCCIDENTALIS Greene. Rubbish-tip, Eastville, 1918, *Miss Roper*, vide spn. in her Herb.—S.W. United States of America.

*M. DECIPIENS C. Koch. Boiling Wells tip, *Mrs Wedgwood* in *Rep. B.E.C.*, 1919.—Asia Minor, Persia.

M. DISCIFORMIS DC. St Philip's Marsh, 1919, *Misses Cobbe.* Baptist Mills, 1916; Avonmouth Docks, 1927, *S.*—Asia Minor, Persia.

ARTEMISIA ABSINTHIUM L. St Philip's, 1909; Portishead, 1849, *Herb. Cundall* in *White Fl.* Tip, Portishead South, 1916, *S.* Frequent at St Philip's and Avonmouth Docks, *S.*—Europe (mainly Central and S.), Medit. Reg.

A. VULGARIS L., var. COARCTATA Fors. Waste ground, St Anne's, 1921, *S.*—Europe, Asia.

A. SCOPARIA W. et K. Baptist Mills, 1926, 1932, *S.* Avonmouth Docks, 1930, *Evans.*—Central and E. Europe, Asia.

A. ABROTANUM L. Outcast, *e.g.* on rubbish-tip at Eastville, 1918, *Miss Roper.*—Cult., origin unknown.

*A. PONTICA L. Colliery waste-heap, Kingswood, 1886, *White Fl.*—Central and E. Europe, W. Asia.

A. BIENNIS Willd. St Philip's Marsh, 1915, *Green* and *S.* St Anne's, 1918; Bedminster, *S.* Frequent, Avonmouth Docks, 1927-31, *Gibbons, Evans.* This is probably the plant referred to as *A. Tournefortiana* in *White Notes Suppl. Fl.*, 1918.—Temp. Asia, N. America.

A. LUDOVICIANA Nutt., var. GNAPHALODES (Nutt.). Waste ground by Temple Meads Station and the Cattle Market, *S.* Avonmouth Docks, 1923, *S.*—N. America.

PETASITES FRAGRANS Presl. Well established in many places. Waste land by the Hotwell Road. Railway embankment by the Avon under Durdham Down. Fishponds. By Avonmouth Station. Brislington. Not mentioned by *Swete Fl.* (1854). The earliest local record, *Proc. Brist. Nat. Soc.*, 1872, *White Fl.*—S. Italy, Sicily, Sardinia.

SENECIO SQUALIDUS L. Wapping Wharf, 1911, *Miss Roper*; Station-yard, Portishead, 1914-16; *White Notes Suppl. Fl.*, where mention is made of the plant steadily spreading. Now to be found on rail and dockland in many places.—Medit. Reg.

Var. LEIOCARPUS Druce. With glabrous fruit. Portishead Dock, 1916, *Mrs R. Price* in *White Notes Suppl. Fl.*, 1918.

Var. SUBINTEGER Dr. Avonmouth Docks, 1930, *S.*

× VULGARIS = BAXTERII Dr. Avonmouth Docks, 1927, *S.*

S. VISCOSUS L. First noticed on railway embankment, Ashley Hill, 1892; frequent about the railways at Avonmouth; and the old iron-works at Ashton Gate, *White Fl.*—Europe, Asia Minor.

S. VULGARIS L., var. RADIATUS Koch. Avonmouth Docks, 1909, *C. Bucknall.* Frequent there and along St Andrews Road. Portishead Station-yard, first observed, 1900. Common in many places.—Europe, Medit. Reg., N. Asia.

CALENDULA OFFICINALIS L. Luckwell Road, 1921, *Miss Roper.* Avonmouth Docks. A frequent garden outcast.—Medit. Reg.

C. ARVENSIS L. St Philip's Marsh, 1910, *Miss Roper.* Bedminster, 1918, *Misses Cobbe.* Eastville, 1922, *S.* and *Gambier-Parry.* Avonmouth Docks, 1926, *Gibbons*; 1927, *S.*—Central Europe, Medit. Reg.

CRYPTOSTEMMA CALENDULACEUM (L.) Dr. Fowl-run, Baptist Mills, 1927, *S.* Avonmouth Docks, 1931, *S.*—S. Africa. Established in Australia, and in Spain and Portugal.

CARDUUS NUTANS L., var. MACROCEPHALUS (Desf.). St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.* Avonmouth Docks, 1931-2, *S.*—Medit. Reg.

C. ACANTHOIDES L. × NUTANS L. Avonmouth Docks, 1932, *S.*

C. PYCNOCEPHALUS L. Bedminster, 1930, *S.* Avonmouth Docks, 1931, *S.*—Medit. Reg.

*ONOPORDON ACANTHIUM L., var. VIRIDE Michet. Waste ground near the deserted Avonside brick-works at St Philip's, 1903-9; Portishead Station-yard, 1905, *Miss Livett* in *White Fl.*—Central Europe, Medit. Reg.

*O. ILLYRICUM L. St Philip's Marsh, 1921, *Miss Roper.*—Medit. Reg.

MARIANA LACTEA Hill. Horfield, 1878, *W. E. Green*; near Avonmouth, 1880-1911; quarry at the top of Pembroke Road, Clifton, 1898; Portishead Station-yard, 1909, *Miss Roper* in *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Frequent at Shirehampton and Avonmouth Docks, *S.*—Britain, France, Central Europe, Medit. Reg.

CENTAUREA CYANUS L. St Vincent's Rocks and Horfield, *Swete Fl.*; on dredgings in the Black Rock Quarry, 1883-4; Kingswood; St Philip's Marsh, 1899; St Anne's, 1905, *Miss Roper*; on mill-refuse at Portishead, 1902-9, *White Fl.* Avonmouth Docks, *S.* A frequent outcast.—Europe, Medit. Reg.

*C. SEUSEANA Chaix. On rubbish in St Philip's Marsh, 1904-7, *White Fl.*—Alps, Medit. Reg.

*C. PANICULATA L. On colliery shale, Kingswood, 1881-4, *White Fl.*—Medit. Reg.

C. CALCITRAPA L. St Philip's, 1904, and subsequently; Station-yard, Portishead, on mill-refuse since 1905, *White Fl.* Bedminster, 1926, *S.* Avonmouth Docks, 1927, *Gibbons.*—Britain, France, Central Europe, Medit. Reg.

C. IBERICA Trev. Baptist Mills, 1927 and 1931, *S.* St Anne's, 1928, *Gibbons.*—E. Medit. Reg.

C. DIFFUSA Lam. Baptist Mills, 1922; Avonmouth Docks, 1929, *S.*—E. Medit. Reg.

C. MACULOSA Lam. Avonmouth Docks, 1930, *S.*—Central and E. Europe, W. Asia.

C. SOLSTITIALIS L. St Philip's Marsh, 1898, *Waterfall*; Portishead Station-yard since 1905-12, *White Fl.* Kingswood, *S.* Railway siding between Shirehampton and Avonmouth, 1917, *S.* Avonmouth Docks, *S.*—Medit. Reg.

C. MELITENSIS L. On dredgings in the Black Rock Quarry, 1883; St Philip's Marsh for many years; Portishead Station-yard, 1908, *White Fl.* Common now.—Medit. Reg.

*C. PALLESCENS Delile. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.*—E. Medit. Reg.

Var. HYALOLEPIS Boiss. Baptist Mills, 1918, *S.*—E. Medit. Reg.

C. SALMANTICA L. (MICROLONCHUS SALMANTICUS Salzm.). Baptist Mills, 1911, *Miss Roper.* St Philip's Marsh, 1916; Eastville, *Misses Cobbe.* Ashton Gate, 1918; Bedminster, 1922, *S.*—Medit. Reg.

C. DILUTA Ait. Baptist Mills, 1925-6, *S.* St Anne's, 1928, *Gibbons.* Wapping Wharf, *Evans.*—Iberian Peninsula.

CARTHAMUS LANATUS L. Bedminster, 1922-6, *S.* Avonmouth Docks, *S.*, and 1931, *Evans.*—Central Europe, Medit. Reg.

C. TINCTORIUS L. Horfield, 1915, *Evans.* St Philip's Marsh; Eastville, 1916, *Misses Cobbe* and *Druce.* Cranbrook Road, 1917, *Ald. Gardner.* Bishops Road, 1929, *Gibbons.* St Anne's, 1917; Avonmouth Docks, *S.* Rather common. For an interesting note see *White Notes Suppl. Fl.*—Orient and Cult.

*Scolymus hispanicus L. St Philip's Marsh, 1910, *Miss Roper* in *White Fl.*—Medit. Reg.

S. maculatus L. Wee Lane, 1922, *S.*—Medit. Reg.

Cichorium Intybus L. Common. With white flowers, St Philip's Marsh, 1904, *Miss Roper* in *White Fl.*—Europe, Medit. Reg., N. Asia.

*Rhagadiolus edulis Gaertn. (R. stellatus Gaertn.). St Philip's Marsh, *Miss Cobbe* in *Rep. B.E.C.*, 1916.—Medit. Reg.

Picris Sprengeriana Poir. Baptist Mills, 1925-8, *S.* Wapping Wharf, 1931, *Evans.*—Medit. Reg.

Crepis taraxacifolia Thuill. Increasingly common.—W. and Central Europe, W. Medit. Reg.

Hieracium aurantiacum L. (H. brunneo-croceum Pugsley). Walls about Richmond Hill, Clifton; Walls at Kingswood, 1868, *Herb. St Brody* in *White Fl.* Avonmouth Docks, 1929, *S.*—Europe.

*H. pratense Tausch. Established on walls, Brislington, *Miss Roper* in *White Notes Suppl. Fl.*, 1918.—Central and E. Europe, N. Asia.

*H. maculatum Sm. St Vincent's Rocks, and wall, Bellevue, Clifton; Station-yard, Portishead, 1904, *White Fl.*—Europe.

H. diaphanoides Lindeb. Avonmouth Docks, 1932, *S.*, teste *Horwood.*—Europe.

*H. cacuminatum Dahlst. Site of old iron works, Ashton Gate, 1915, *Miss Roper* in *White Notes Suppl. Fl.*, 1918.—Europe.

H. pulmonarioides Vill. (H. amplexicaule of *White Fl.*). Wall, Richmond Hill, Clifton, established, *White Fl.*, and still there. See *Pugsley* in *Journ. Bot.*, 1920, 281.—France, Central Europe.

H. boreale Fries. On old walls, *Stapleton, Herb. Stephens*; Crews Hole, *Swete Fl.* and *H. O. Stephens* in *Herb. Clark, White Fl.*—W. and Central Europe.

Lactuca virosa L. St Vincent's Rocks, 1828, *Rootsey, T. B. Flower in litt.*, 1883, *Swete Fl.*; Portishead Dock, 1900, *White Fl.* Railway siding between Shirehampton and Avonmouth, *S.* Established, Avonmouth Docks, 1931, *Evans, S.*—Europe, Medit. Reg.

L. Serriola L. Avonmouth Docks, 1929-30, *Gibbons* and *S.*—Europe, Medit. Reg.

L. saligna L. Avonmouth Docks, 1928, *S.*—Europe, Medit. Reg.

L. tatarica C. A. Mey. Avonmouth Docks, 1932, *Evans* and *S.*—Russia, Caucasus, Orient.

Sonchus arvensis L., var. glabrescens Hall. Avonmouth Docks, 1923, and persistent, *S.*—Europe, Medit. Reg.

Zacyntha verrucosa Gaertn. Brislington, 1913, *Evans.*—Medit. Reg.

*Tragopogon porrifolius L. First recorded as a Bristol plant by Banks and Lightfoot, 1773. "By the river side towards Cooks Folly." A specimen of Sir Joseph's is in *Herb. Brit. Mus.* In June 1799, Mr Sowerby gathered the specimen figured in *English Botany* "in the meadows, below St Vincent's Rocks, Bristol," *White Fl.* Seen by the railway below Cooks Folly in recent years by *Mrs Bell.* Adventive, Horfield, 1922, *Miss Roper.*—Medit. Reg.

T. HYBRIDUS L. (GEROPOGON GLABER L.). St Philip's Marsh, 1922, *S.*, teste *Thellung.*—Medit. Reg.

CAMPANULACEAE.

CAMPANULA RAPUNCULOIDES L. Casual, on Durdham Down, 1932, *Evans.* —Europe, W. Asia.

*LEGOUSIA SPECULUM-VENERIS (L.) Fisch. St Philip's Marsh, 1904-7; Baptist Mills, 1911, *Evans*; Portishead Station-yard, 1907-9, *White Fl.* Introduced with grain siftings.—Central Europe, Medit. Reg.

PRIMULACEAE.

*ANDROSACE MAXIMA L. Portishead Station-yard, 1909, *Miss Hill* in *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.*—Central Europe, Medit. Reg.

ANAGALLIS FOEMINA Mill. (A. CAERULEA Schreb.). Horfield, 1843, *Thwaites* in *Herb. Brit. Mus.* St Philip's Marsh, 1901, and after; Ashley Hill, 1911 (constant); Avonmouth Docks; Portishead Station-yard, *White Fl.*—Medit. Reg.

APOCYNACEAE.

*VINCA MAJOR L. St Anne's, Brislington, *White Fl.*—Medit. Reg.

LOGANIACEAE.

BUDDLEIA DAVIDII Franch. Established in the quarry under Durdham Down, and by the Avon under Leigh Woods on the Somerset side.—China.

POLEMONIACEAE.

COLLOMIA LINEARIS Nutt. Ashton Gate, 1922; Avonmouth Docks, 1924, *S.*—N. America.

GILIA CAPITATA Sims. Bedminster, 1922; near the Cattle Market, Bristol, 1924, *S.*—N. America.

NAVARRETIA INTERTEXTA (Benth.) Hook. St Philip's Marsh, 1919, *S.*, teste *Dr I. M. Johnston.*—N. America.

HYDROPHYLLACEAE.

PHACELIA CILIATA Benth. St Philip's Marsh, 1919, *S.* Avonmouth Docks, 1931-2, *S.* and *Gibbons.*—California, N. Mexico.

P. TANACETIFOLIA Benth. St Anne's, 1927; Avonmouth Docks, 1928, *S.*—California.

BORAGINACEAE.

HELIOTROPIUM EUROPAEUM L. Bristol, 1914, *J. W. White.* Horfield, 1925, *Gibbons.* Baptist Mills, 1925; Ashley Hill; Avonmouth Docks, *S.*—Central Europe, Medit. Reg.

*OMPHALODES VERNA Moench. Alien, established in a steep stony wood by the Avon, Hanham, 1889, *White Fl.*—Central Europe.

PLAGIOBOTHRYS CANESCENS Benth. Ashton Gate, 1917, *S.*, teste *Dr I. M. Johnston*, 1932. This is the *P. tenellus* of *Rep. B.E.C.*, 1918, 295. A new alien to Europe, *Thellung.*—California.

LAPPULA ECHINATA Gilib. St Philip's Marsh, 1905, *Miss Roper;* Kingswood, *White Fl.* Avonmouth Docks and on other waste ground, frequent, *S.*—Europe, Asia, N. Africa.

ASPERUGO PROCUMBENS L. St Philip's Marsh, 1909, and subsequently; on sweepings, by Fox's Wood quarries in 1891, *Withers;* Ashley Hill, 1912, *Evans*; Portishead Station-yard, 1905, *Miss Peck* in *White Fl.*—Europe, Medit. Reg., N. Asia.

AMSINCKIA INTERMEDIA F. et M. For references see *White Fl.*, 430. *Dr I. M. Johnston*, the well-known authority on Boraginaceae, refers all our local plants to *A. intermedia.* A frequent casual in the Docks and other waste places, very variable in size and colour of the corolla.—N. America.

SYMPHYTUM TUBEROSUM L. Alien, Railway cutting, Clifton Down Station; Montpelier, 1888, *H. S. Thompson* in *White Fl.* Naturalised in Stoke Bishop Wood, and in Leigh Woods, 1932, *S.*—S.W. Europe.

*S. PEREGRINUM Ledeb. Railway bank overlooking St Philip's Marsh, 1911, *Miss Roper* in *White Fl.*—Russia, Orient; widely naturalised elsewhere.

*BORAGO OFFICINALIS L. Shirehampton and Stapleton Bridge, *Stephens Cat.* (1835); Bedminster; and by a roadside, Leigh Woods, 1905, *White Fl.*—Medit. Reg.

ANCHUSA OFFICINALIS L. St Philip's Marsh, 1902, and after, *White Fl.*; 1916, *S.* Brislington, 1891; Portishead Station-yard from 1905, *White Fl.* Arno's Vale, Brislington, 1917, *Miss Roper*, but this has narrow bracts, and may represent a distinct species.—Medit. Reg.

*A. OCHROLEUCA M. Bieb. St Philip's Marsh, 1908-9, *White Fl.*—Eastern Medit. Reg.

A. AZUREA Mill. (A. ITALICA Retz.). St Philip's Marsh, 1908-9, *White Fl.* Avonmouth Docks, 1929, *S.*—Central Europe, Medit. Reg.

A. STYLOSA M. Bieb. Portishead Station-yard, 1912, *S.*—Eastern Medit. Reg.

LYCOPSIS ARVENSIS L. Avonmouth railway, 1905, *Miss Roper;* Brislington, *Herb. Stephens*, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.*—Europe, Medit. Reg.

*NONNEA PULLA DC. St Philip's Marsh, 1916, *Misses Cobbe* in *Rep. B.E.C.*, 1917.—Central and E. Europe, W. Asia.

LITHOSPERMUM ARVENSE L. By Montpelier Station, 1882; on rubbish, St Philip's Marsh, yearly; garden weed at Brislington; Portishead Station-yard, *White Fl.* Frequent between Shirehampton and Avonmouth, *S.*—Europe, Medit. Reg.

ECHIUM VULGARE L. Railway cutting below Bristol; Portishead, *Miss Livett* in *White Fl.* Avonmouth Docks, *S.*—Europe, Medit. Reg., N. Asia.

E. PLANTAGINEUM L. St Philip's Marsh, 1916, *Misses Cobbe.* Eastville, 1918, *S.* Avonmouth Docks, 1927, *S.*—Medit. Reg.

*E. TUBERCULATUM Hoffm. et Link. Near Bristol, 1917, *Miss Roper* in *Rep. B.E.C.*, 1917.—Medit. Reg.

*E. ITALICUM L. St. Philips, Bristol, 1907-9; Portishead Station-yard, 1909, *White Fl.* Cranbrook Road, 1927, *Gibbons.*—Medit. Reg.

*CERINTHE MINOR L. On made ground, St Philip's, Bristol, 1907-9, *White Fl.*—Central Europe, E. Medit. Reg.

CONVOLVULACEAE.

IPOMOEA PURPUREA (L.) Lam. Eastville, 1921; Bedminster, 1928, *S.*—Tropics.

CUSCUTA TRIFOLII Bab. Appeared at Shirehampton, on a bank of the new Portway to Avonmouth, 1923.—Europe.

C. SUAVEOLENS Ser. On *Medicago lupulina*, Baptist Mills, 1927, *S.*—S. America.

C. TINEI Insenga, sub-sp. C. CESATIANA (Bert.). Kingswood, 1932, on *Polygonum aviculare*, *S.*—Medit. Reg.

SOLANACEAE.

LYCOPERSICUM ESCULENTUM Mill. St Philip's Marsh, 1916, *Misses Cobbe.* Common.—S. America.

SOLANUM NIGRUM L. Everywhere.—Throughout the world.

*Var. PROSTRATUM F. Ger. St Philip's, 1922, *Miss Roper.*

S. SUFFRUTICOSUM Schousb. Railway siding near Shirehampton, 1917, *S.*—Medit. Reg.

S. ALATUM Moench. (S. MINIATUM Bernh.). Avonmouth Docks, 1931, *S.* A glabrescent form, fruiting well.—Europe, Medit. Reg.

S. ROSTRATUM Dunal. Colliery heap, Kingswood, 1882, *White Fl.* St Philip's Marsh, 1911, *White Notes Suppl. Fl.*, 1918. Wee Lane, 1918, *S.* St Anne's, 1922, *Gibbons.*—N. America, Mexico.

S. TRIFLORUM Nuttall. St Philip's Marsh, 1914; Bristol Harbour, 1912-16, *White Notes Suppl. Fl.*, 1918. Brislington, 1916, *S.* Avonmouth Docks, 1927-30, *S.* and *Gibbons.*—N. America. An interesting variety with subentire, dentate leaves occurred at Ashton Gate, 1917, *S.* For this no name has yet been found.

S. SISYMBRIIFOLIUM Lam. St Philip's Marsh, 1922, *Miss Roper.* Avonmouth Docks, 1928, *S.* and *Gibbons.*—S. America.

S. SARRACHOIDES Sendtn. Avonmouth Docks, 1926, *White, S.*, and 1928, *Gibbons.*—Temp. S. America.

CAPSICUM ANNUUM L. Avonmouth Docks, 1930, *S.*—Trop. America.

PHYSALIS ANGULATA L. Baptist Mills, 1925, *S.* Avonmouth Docks, 1930, *Gibbons.*—Tropics.

P. PUBESCENS L. Avonmouth Docks, 1932, *Gibbons* and *Evans.*—N. and Tropical America.

P. FOETENS Poir. St Philip's Marsh, 1916, *Druce, Misses Cobbe, S.* Bedminster, 1926, *S.*—Tropical America.

NICANDRA PHYSALOIDES Gaertn. Ashton Gate, 1918, *Misses Cobbe.*—Peru.

LYCIUM CHINENSE Mill. (L. BARBARUM auct.). Waste ground, Bedminster, 1932, *S.*—China.

DATURA STRAMONIUM L. Redland, *Leipner* and *Rogers*; St Philip's Marsh, 1906; Avonmouth, *Wheeler*; Dunghill, Bristol, *Herb. Stephens*; and mentioned in an old list of Bristol Plants, circa 1830, *White Fl.* Eastville and Brislington, 1916, *White Notes Suppl. Fl.* Bedminster; Portishead, 1932, *S.*—Central Europe, Medit. Reg., Asia, Africa, N. America.

HYOSCYAMUS NIGER L. St Philip's, 1898-1912; Bristol Harbour, 1911; Shirehampton, 1849, *Swete Fl.*; Avonmouth and Portishead, *White Fl.* Common.—Europe, Medit. Reg., N. Asia.

NICOTIANA RUSTICA L. Avonmouth Docks, 1928, *Gibbons*; 1930, *Evans.*—Mexico, Texas and Cult.

SCROPHULARIACEAE.

VERBASCUM PHLOMOIDES L. St Philip's Marsh, 1907-9, *White Fl.* Garden weed, Clifton, 1931, *S.*—Central Europe, Medit. Reg.

V. PULCHRUM Vel. Portishead Docks, 1932, *S.*; agreeing well with specimens so named at Kew.—Balkan Peninsula.

V. VIRGATUM Stokes. St Philip's Marsh, 1904; Kingswood, 1884, *White Fl.* Avonmouth Docks, *S.*—W. Europe, N. Italy.

[" V. BLATTARIOIDES Lam." St Philip's Marsh, 1909, *White Fl.* Some other species is perhaps intended, since *V. blattarioides* Lam. is treated by authors as synonymous with *V. virgatum.*]

V. BLATTARIA L. Railway Cutting, Clifton Down Station, 1888-1912; St Philip's Marsh; Port and Pier railway under the Downs; Portishead Station-yard; bank of G.W.R., Brislington, *White Fl.* Avonmouth Docks, 1932, *S.*—Europe, Medit. Reg.

V. LYCHNITIS L. Waste ground, St Philip's, 1904, *White Fl.* Avonmouth Docks, 1932, *S.* and *Evans.*—Europe, Medit. Reg.

[V. NIGRUM L. *Swete Fl.*, doubtful, *White Fl.*—Europe, N. Asia.]

*V. BOERHAVI L. St Philip's Marsh, 1907-9, *White Fl.*—W. Medit. Reg.

*V. SINUATUM L. St Philip's Marsh, 1906-9, *White Fl.*—Medit. Reg.

*V. SPECIOSUM Schrad. St Philip's Marsh, 1909, *White Fl.*—Central and E. Europe, W. Asia.

V. CHAIXII Vill. St Philip's Marsh, 1907-11; established near the old iron-works, Ashton Vale, *White Fl.* Avonmouth Docks, 1929-1932, *S.*, *Gibbons* and *Evans.*—W. Medit. Reg.

V. PHOENICEUM L. Ashton Vale, 1911, *C. Bucknall* in *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, 1928-1932, *S.*—Central and E. Europe, W. Asia.

LINARIA PURPUREA Mill. St Vincent's Rocks; railway bank under the Downs since 1903; on walls, Clifton and Bristol, *White Fl.*

Established on waste land, Ashton Gate; and on the railway siding between Shirehampton and Avonmouth, *S.*—S. Italy, Sicily.

L. REPENS (L.) Mill. Included in a list of Bristol plants, 1830, and *Worsley Cat.*, 1835; Bristol Harbour, 1911, *White Fl.* Avonmouth Docks, 1928, *S.*—W. Europe.

*L. PELISSERIANA Mill. On a wall at Brislington, *Herb. Stephens*; same locality, 1886, *White Fl.*—Channel Is., France, Medit. Reg.

L. MINOR (L.) Desf. Railways and Docks, common.—Europe, Medit. Reg.

L. CHALEPENSIS (L.) Mill. St Philip's Marsh, 1916, *S.* and *Druce*. This is presumably the plant recorded as *L. arvensis* Desf. in *Rep. B.E.C.*, 1916, 514.—Medit. Reg.

L. DALMATICA Mill. Avonmouth Docks, 1931, *Gibbons*; *S.*—E. Medit. Reg.

*L. ITALICA Trev. St Philip's Marsh, 1909-10, *Miss Roper* in *White Fl.* —Central and E. Europe.

L. CYMBALARIA (L.) Mill. Established on walls, everywhere. A white-flowered variety in Pitch and Pay Lane, also at Brislington, *White Fl.*—Central and S. Europe.

ANTIRRHINUM MAJUS L. Well established on St Vincent's Rocks, and on cliffs of the Great Quarry, *White Fl.*—Medit. Reg.

A. ORONTIUM L., var. CALYCINUM (Lam.). (A. GRANDIFLORUM Chav.). St Philip's Marsh, 1904-6; Baptist Mills, 1911, *Evans* in *White Fl.* Same locality, 1917, *Mrs Wedgwood*; 1925, *S.*—Medit. Reg.

*SCROPHULARIA VERNALIS L. Cranbrook Road, *Mrs Bell.*—Central and E. Europe.

VERONICA PERSICA Poir. (V. TOURNFORTII Gmel.). Everywhere. "This is a comparatively recent introduction from the East which has spread with astonishing rapidity. *Flower* spoke of it as rare about Bristol, 1840. *Swete* himself could not have seen a specimen," *White Fl.*

*BARTSIA TRIXAGO L. St Philip's Marsh, 1916, *Misses Cobbe.*—W. France, Medit. Reg.

OROBANCHACEAE.

*OROBANCHE SPECIOSA DC. (O. CRENATA Forsk.). St Philip's Marsh, 1905, *White Fl.*—Parasitic on beans and peas throughout the Mediterranean Region.

O. RAMOSA L. St Philips, 1905, 7, 9, apparently on *Melilotus*, *White Fl.* St Philip's Marsh, 1915, *T. H. Green*; 1916, *Lady Davy.*—Central Europe, Medit. Reg.

VERBENACEAE.

VERBENA SUPINA L. Baptist Mills, 1925, *S.*—Medit. Reg.

V. TENERA Spreng. Bedminster, 1918, *Misses Cobbe*; 1932, *S.*, on site of an old fowl-run, about to be built upon.—Temp. S. America.

LABIATAE.

ELSHOLTZIA PATRINI Garcke. (E. CRISTATA Willd.). Avonmouth Docks, 1930, *S.*—N. and E. Temperate Asia.

*MENTHA ROTUNDIFOLIA (L.) Huds. Shirehampton, *Swete Fl.* in *White Fl.*—Europe, Medit. Reg.

M. ALOPECUROIDES Hull. Waste ground, Bedminster, 1926, *S.*—W. and Central Europe.

M. LONGIFOLIA (L.) Huds. Casual, Bedminster, 1928, *S.*—Europe, Medit. Reg.

*M. SPICATA Huds. (M. VIRIDIS L.). Ashley, 1849, *Herb. Cundall*; St Philip's, 1910, *White Fl.*—Europe, Cult.

M. GENTILIS L. (ARVENSIS × SPICATA). Stapleton, *Stephens* in *Swete Fl.* Casual on waste ground at Bedminster, 1930, *S.*—Europe.

M. PULEGIUM L. Waste ground, Bedminster, 1926, *S.*—Europe, Medit. Reg.

MELISSA OFFICINALIS L. Railway under St Vincent's Rocks, 1881-4; Tyndalls Park, 1906; waste ground, Stapleton Road, 1911, *S.*; Portishead Railway-yard, 1908, *Miss Roper* in *White Fl.*—Medit. Reg.

SALVIA NEMOROSA L. (S. SYLVESTRIS auct. angl., non. L.). Kingswood, 1880-90, *White Fl.* St Philip's Marsh, 1902, *White Fl.*; 1915, *S.*; 1916, *Misses Cobbe.* Wee Lane, 1927, *S.* Avonmouth Docks, *S.* Portishead Dock, *S.* The identity of this common plant of Central Europe was settled long ago by the Austrian botanist, Kerner, who pointed out that *S. sylvestris* L. is the hybrid *S. nemorosa* × *pratensis*. *S. sylvestris* L. is often recorded erroneously from waste ground in Britain; the specimens should in most cases be referred to *S. nemorosa.*—Central and E. Europe, W. Asia.

S. HORMINUM L. Portishead, 1917, *S.*—Medit. Reg. (mainly Eastern).

S. VERTICILLATA L. Kingswood Colliery dump, 1880-90, *White Fl.* St Philip's, 1898, *White Fl.*; 1915-16, *Misses Cobbe* and *S.* Portishead Station-yard, 1900, *White Fl.* Avonmouth Docks, frequent.—Central Europe, Medit. Reg.

NEPETA CATARIA L. Waste ground. Redland, *Gibbons* and *Evans.*—Europe, W. Asia.

*N. MUSSINI Sprengel. Waste ground. Bristol, Glos., 1928, *G. C. Druce.*—Orient.

DRACOCEPHALUM PARVIFLORUM Nuttall. Eastville, 1918, *S.* St Philip's Marsh, 1923; Avonmouth Docks, 1928, *S.*—N. America.

*LALLEMANTIA IBERICA F. et M. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1919. teste *Thellung.*—Orient.

SIDERITIS MONTANA L. Bristol Harbour, 1911, *Miss Roper* in *White Fl.* St Philip's Marsh, 1915, *S.* and *Green.* Avonmouth Docks, 1930, *S.* and *Gibbons.* Portishead, *S.* Quite frequent.—Medit. Reg.

S. LANATA L. St Philips Marsh, 1915, *S.* and *Green.*—E. Medit. Reg.

MARRUBIUM VULGARE L. St Vincent's Rocks; Durdham Down, *White Fl.* Brandon Hill, *Stephens* in *White Fl.* Casual, Baptist Mills, 1925, *S.*—Europe, Medit. Reg.

M. ALYSSON L. Eastville, 1917, *S.*—Medit. Reg.

*M. PEREGRINUM L. Portishead, 1895, *Miss Walker* in *Rep. B.E.C.*, 1923.—Central and E. Europe, W. Asia.

STACHYS GERMANICA L. Fowl-run, Kingswood, 1917, *S.* Baptist Mills, 1931, *S.*—England, France, Central Europe, Medit. Reg.

S. ANNUA L. Colliery waste heap, Kingswood, 1883-8, *White Fl.* St Philip's Marsh, 1901-4, *White Fl.;* 1916, *S.* Wee Lane, *S.* Avonmouth Docks, 1931, *S.* and *Gibbons.* Portishead Station-yard, 1904-8, *White Fl.*—Europe, Medit. Reg.

*S. RECTA L. Portishead, 1898, *Miss Walker* in *Rep. B.E.C.*, 1923.—France, Central Europe, Medit. Reg.

*S. SALVIIFOLIA Ten. (S. ITALICA auct.). St Philip's Marsh, 1919, *G. C. Druce.*—Italy, Sicily, Dalmatia.

GALEOPSIS LADANUM L., sens. lat. St Vincent's Rocks, *Shiercliff's Guide* (1789), and *Herb. Stephens* in *White Fl.*—Europe, W. Asia.

Var. INTERMEDIA (Vill.) Vis. Avonmouth Docks, 1931, *S.; Evans.*—Europe, W. Asia.

LEONURUS CARDIACA L. Numerous old records in *White Fl.* First record, waste ground, Bristol, June, 1799, *Dawson Turner* and *James Sowerby.* Portishead, 1903, *Miss Martin* in *White Fl.;* bank of Portishead Railway, under Leigh Woods, 1911, *S.* Kingswood, 1917, *S.* Baptist Mills, 1931, *S.*—Europe, Temp. Asia.

Var. HIRSUTUS Hornem. Portishead Dock, *Miss Roper.* Well established.

*WIEDEMANNIA ORIENTALIS F. et M. St Philip's Marsh, 1916, *Misses Cobbe* in *Rep. B.E.C.*, 1916. Portishead, *Miss Livett* ex *White*, *Rep. B.E.C.*, 1916.—Orient.

*LAMIUM MACULATUM L. Numerous old records in *White Fl.* First local record: on a bank in a lane near Redland Court, by *Mrs Vaughan*, 1813; *Sowerby's sketch for Engl. Bot.* That locality seems to have been one of the first in which the plant became naturalised in this country, *White Fl.*—Europe, W. Asia.

L. HYBRIDUM Vill. On rubbish at Montpelier, *Stephens Cat.* (1835) in *White Fl.* Portishead, under a wall, *D. Fry*; Railway near the Station, Portishead, 1907, *White Fl.* These perhaps are hardly casual occurrences.—N. and W. Europe, W. Medit. Reg.

L. AMPLEXICAULE L. Troopers Hill and Crews Hole, *White Fl.* Waste ground, near Portishead Station, repeatedly, *White Fl.*—Europe, Medit. Reg., N. Asia.

BALLOTA NIGRA L., var. MOLLISSIMA Dr. Waste ground, Ashton Gate, 1928, *S.*—Britain, ? elsewhere.

B. RUDERALIS Sw. St Philip's Marsh, 1916, *S.* and *Green.* Avonmouth Docks, 1932, *S.* Portishead Dock, *Ellman* and *S.*—Central and E. Europe.

*TEUCRIUM CHAMAEDRYS L. Shirehampton, 1839, *Herb. Powell* in *White Fl.*—Europe, Medit. Reg.

T. SPINOSUM L. Fowl-run, Baptist Mills, 1925, *S.*—W. Medit. Reg.

T. RESUPINATUM Desf. Fowl-run, Baptist Mills, 1925, *S.*—Spain, N. Africa.

*AJUGA CHAMAEPITYS (L.) Schreb. One plant on dredgings in the Black Rock Quarry, 1883; one on rubbish tipped in St Philip's Marsh, 1887, *White Fl.*—England, France, Central Europe, Medit. Reg.

AMETHYSTEA CAERULEA L. Avonmouth Docks, 1930, *S.*—N. and E. Temp. Asia.

PLANTAGINACEAE.

PLANTAGO INDICA L. (P. ARENARIA W. et K.). On old colliery rubble. Kingswood, 1880-4; on a tip, St Philip's Marsh, 1904, *White Fl.* Avonmouth Docks, frequent. Portishead Dock, *S.*—Central Europe, Medit. Reg.

P. PSYLLIUM L. Wee Lane, in a fowl-run, 1922, *S.*—Medit. Reg.

P. LANCEOLATA L. Proliferous forms are noted from waste ground in St Philip's Marsh, 1905, Avonmouth, 1900, and a railway bank at Montpelier Station, in *White Fl.* Waste land near Shirehampton, 1923; Cranbrook Road, 1929, *S.*—Europe, Medit. Reg., N. Asia.

P. MAJOR L., var. BRACTEATA Dr. Avonmouth Docks, 1928, *S.*—The species in Europe, Medit. Reg. and introduced throughout the world.

P. NOTATA Lag. Tip at Eastville, 1917, *S.*—S.W. and E. Medit. Reg.

P. LAGOPUS L. Portishead Station-yard, 1907, *Miss Roper*; and on a fowl-run under Ashley Hill, 1911, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, frequent, *Gibbons*; *S.*—Medit. Reg.

P. ARISTATA Michx. Waste ground, Bedminster, 1922, *S.*; Portishead Dock, 1922, *S.*—N. America.

ILLECEBRACEAE.

PARONYCHIA POLYGONIFOLIA DC. Fowl-run, Wee Lane, 1922, *S.*—Pyrenees, Cevennes, Alps, Spain, Corsica, Liguria.

HERNIARIA HIRSUTA L. On waste ground at St Philip's Marsh, 1904, *White Fl.*; 1915, *S.* and *Green.* Tip at Portishead South, 1914, *S.*—Europe, Medit. Reg.

SCLERANTHUS ANNUUS L. Casual on a railway siding at Ashley Hill, 1928, *S.*—Europe, Medit. Reg.

AMARANTHACEAE.

*AMARANTHUS HYBRIDUS L. St Philip's Marsh, 1916, *Misses Cobbe* in *Rep. B.E.C.*, 1918.—Trop. America.

A. CHLOROSTACHYS Willd. Bedminster, 1922; Avonmouth Docks, *S.*—Trop. America, Medit. Reg.

Var. PSEUDO-RETROFLEXUS Willd. Bristol, 1923, *S.*, det. *Thellung.*

Var. ARISTULATUS Thell. Eastville, 1920; Bedminster, 1921, *S.*

A. QUITENSIS H. B. K. Tip at Eastville, 1921, *S.*—Extratrop. America.

A. RETROFLEXUS L. Common in the area. First records, St Philip's Marsh and Portishead Station-yard, 1900, *White Fl.*—Tropics.

Var. DELILEI Thell. Bedminster, 1925, *S.*

A. SPINOSUS L. Avonmouth Docks, 1926, *S.*; 1928, *Gibbons.*—Tropics.

A. THUNBERGII Moq. Baptist Mills, 1925, *S.*—South Africa.

A. ALBUS L. First record, Portishead, *Miss Livett* in *White Fl.* Now quite common in the area.—Tropics.

A. ANGUSTIFOLIUS Lam. (A. SYLVESTRIS Desf. A. BLITUM L., pro parte). Rubbish tip, Ashley Hill, 1932, *S.* Ashton Gate, 1906, *Alden;* Bristol Harbour, 1911, *Miss Roper* in *White Fl.* A narrow-leaved form (? *A. graecizans* L.) at Baptist Mills, 1925, *S.* Avonmouth Docks, 1926-8, *S.*—Medit. Reg., Tropics.

A. DEFLEXUS L. St Philip's Marsh and Portishead Dock, 1900-10, *White Fl.* Still at St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, 1926, *S.*; 1930, *Evans* —S. America.

A. LIVIDUS L., race POLYGONOIDES (Zoll.) Thell. Avonmouth Docks, 1930, *S.*—Tropics.

A. GRACILIS Desf. Avonmouth Docks, 1923-6, *S.* Ashton Gate, 1932, *S.*—Tropics.

A. cf. VULGATISSIMUS Speg. e descr. Ashton Gate, 1932, *S.*—Temperate S. America. Not represented at Kew.

CELOSIA TRIGYNA L. Avonmouth Docks, 1928, *Gibbons.*—Trop. Africa.

ALTERNANTHERA FICOIDEA R. et S. Avonmouth Docks, 1927, *S.*—Trop. America. Introduced here from the West Indies, probably with bananas; first British record.

CHENOPODIACEAE.

POLYCNEMUM ARVENSE L. Ashley Hill allotments, 1925, *Gibbons.*—Central Europe, Medit. Reg.

CHENOPODIUM BONUS-HENRICUS L. Black Rock Quarry, 1883; Crews Hole, *Herb. Stephens* in *White Fl.*—Europe, N. Asia, N. America.

CH. HYBRIDUM L. Black Rock Quarry, 1883; Crews Hole, *Herb. Stephens* and *Herb. St Brody;* St Philip's Marsh, 1911, *C. Bucknall* in *White Fl.;* also 1916, *S.* Eastville, 1918, *Miss Roper.*—Europe, Medit. Reg., Temperate Asia, N. America.

CH. RUBRUM L. Locally plentiful, *White Fl.*—Europe, Medit. Reg., N. Asia, N. America.

Var. BLITOIDES Wallr. Portishead, 1914, *S.*

Var. SPATHULATUM Rouy. Bedminster, 1930, *S.*, uncommon.

Var. KOCHIIFORME Murr, var. nov. in *Rep. B.E.C.*, 1927, 316. Bedminster, 1926-30; Avonmouth Docks, 1930, *S.*

CH. URBICUM L. By the Avon under Sneyd Park, 1893, *White Fl.*; and during the construction of Portway, 1923, *S.* and *C. Trapnell.*

St Philip's Marsh, 1915, *S.* and *Green.* Avonmouth Docks, 1928, *S.*—Europe, N. and W. Asia.

Var. INTERMEDIUM (M. & K.) Moq. Avonmouth Docks, 1932, *Gibbons.*

CH. MURALE L. St Philip's Marsh for many years; established in Portishead Station-yard, *White Fl.* Frequent.—Europe, Medit. Reg., Africa, America, Australia.

Var. MICROPHYLLUM L. Brislington, 1916, *Misses Cobbe.* Bedminster, 1926, *S.* Wee Lane, 1925; Avonmouth Docks, 1928, *S.*

CH. GLAUCUM L. Ashton Gate, 1917, *S.*; and 1922, *Miss Roper.*—Europe, Medit. Reg., N. Asia, etc.

Var. PROSTRATUM Beck. Baptist Mills, 1932, *S.*; Avonmouth Docks, 1928, *S.*

Var. MICROPHYLLUM Murr. Bedminster, 1930, *S.*

Var. AMBIGUUM (R. Br.) Hook. St Anne's, 1925, *S.* An interesting plant, only once found, and agreeing with R. Brown's specimen at Kew.—Australasia.

CH. VULVARIA L. (C. OLIDUM Curt.). St Philip's Marsh, 1910, and subsequently; Baptist Mills, 1911; Portishead Station-yard, 1906, *White Fl.* Eastville, 1917, *Miss Roper.* Ashley Hill, 1932, *S.* Portishead South, 1914, *S.*—Europe, Medit. Reg., N. Asia, N. America.

CH. POLYSPERMUM L. Kingsdown, Bristol, 1844, *Herb. Stephens*; St Philip's Marsh, *White Fl.* Eastville, 1917, *Miss Roper.*—Europe, N. and W. Asia.

Var. CYMOSUM Moq. Kingswood, 1925, *S.* Avonmouth Docks, 1925, *S.*

Var. ACUTIFOLIUM Becker. (SPICATUM Moq.). Waste ground, Redland, 1924, *Gibbons.* Railway bank, Ashley Hill, 1931, *S.*

CH. LEPTOPHYLLUM Nutt. Waste ground, Brislington, 1915, *J. W. White.* St Philip's Marsh, 1910, 1916, *Druce.* Ashton Gate, 1921, *S.* Baptist Mills, 1925; Avonmouth Docks, 1928, *S.* Portishead, 1916, *Miss Roper.*—N. America.

CH. ALBUM L. (CANDICANS). Common. With reference to the difficulties presented by this species and its varieties, see *White Fl.* It has been considered advisable by the writer to include only such specimens as have been seen, or personally collected, and determined either by the late Prof. Murr or by Dr P. Aellen. Aellen has rejected many of Murr's varieties and hybrids of *Ch. album*, calling them merely *Ch. album.* In this way Murr's *Ch. lanceolatum* Muhl. also disappears; and there appears to be no evidence of the var. *deltophyllum* J. Murr, Avonmouth, in *Rep. B.E.C.*, 1928. The reason for creating certain new sub-species has not been made clear, and for want of better understanding of the scheme, it seems advisable in this paper to include all as *varieties.*—Cosmopolitan.

Var. VIRIDESCENS St Amans. (var. PAGANUM). Baptist Mills, 1927, *S.*, teste *Murr.*

Var. CYMIGERUM Koch. Eastville, 1921, *S.*, teste *Aellen.*

Var. LANCEOLATIFORME Murr. St Anne's, 1923; Baptist Mills, 1928; Portishead Station-yard, 1930, *S.* Frequent.

Var. OVATUM Aellen. (ssp., Aellen). Avonmouth Docks, 1928, *S.*, and *J. W. White.*

Var. DIVERSIFOLIUM Aellen. (ssp., Aellen). Avonmouth Docks, 1928, *S.*

Cf. var. VIRGATUM (Thunbg.) Aellen. Bedminster, 1930, *S.*

Var. BERNBURGENSE Murr. Baptist Mills, 1919-28; Avonmouth Docks, 1928; Portishead Docks, 1922, *S.*, teste *Aellen.* This is apparently the *C. album*, var. *Borbasiforme* Murr, of *Rep. B.E.C.*, 1929.

Var. PSEUDO-BORBASII Murr, f. MICROPHYLLUM. St Philip's Marsh, 1924, *Druce.* Avonmouth Docks, *S.*

Var. BORBASII Murr. Baptist Mills, 1928. Portishead, 1923, *S.*, teste *Aellen.*

Var. MULTI-SPICATUM Aellen. Avonmouth Docks, 1928, *S.*

× OPULIFOLIUM. Avonmouth Docks, 1928, *S.* and *J. W. White*, teste *Aellen*, 1932.

× BERLANDIERI. Eastville, 1921, *S.*

× STRIATUM. St Anne's, 1928, *S.*, teste *Aellen*, with note that Prof. Murr has determined these plants as *Ch. album* × *striatum*. Plant more or less approaching to *Ch. striatum* (Kras.) Murr. Stem markedly striped with red; glomerules small, more or less olive-green—Grex Euchlorum J. Murr, *in litt.* ad Aellen, *Rep. B.E.C.*, 1921. These plants now occur frequently on waste heaps.

CH. STRIATUM (Kras.) Murr. St Philip's Marsh, October 1905, *J. W. White*, as *C. album*, var. *glomerulosum* Reichb., teste *Sagorski.* In the *Adventive Flora of Tweedside*, p. 285, Murr is quoted as writing of this as the first recorded gathering of the plant (*Ch. striatum* Kras.) in Great Britain; and "the most northerly appearance hitherto known of this south-eastern Asiatic subspecies." Shirehampton, 1920; Avonmouth Docks, 1930, *S.*—S.E. Asia.

Forma EROSUM Murr. Baptist Mills, 1920, *S.*; *Miss Todd.*

CH. BERLANDIERI Moq., ssp. ZSCHACKEI Murr. Avonmouth Docks, 1928, *S.*, teste *Aellen.*—N. America.

× CH. VARIABILE Aellen, var. MURRII Aellen (= CH. ALBUM L. × BERLANDIERI Moq., ssp. ZSCHACKEI Murr).

Var. TYPICUM (Ludwig) Aellen. Brislington, 1917, *S.* Shirehampton, 1923; Avonmouth Docks, 1928, 1931, *S.*, teste *Aellen.*

CH. OPULIFOLIUM Schrad. Black Rock Quarry, 1884, *White Fl.* "The earliest British specimen known to me," *Herb. White.* St Philip's Marsh, 1900, and subsequently. Baptist Mills, 1911; Portishead Dock, 1900-6, *White Fl.* Wee Lane, 1926; Ashley Hill, 1932; Avonmouth Docks, *S.*—Europe, Medit. Reg., N. Asia, America.

Var. MUCRONULATUM Beck. Baptist Mills, 1920, *S.*

Var. PLATANOIDES (Scholz). Shirehampton, 1923, *S.*, teste *Murr.*

CH. HIRCINUM Schrad. Arno's Vale; Eastville, 1916, *S.* St Philip's Marsh, 1916, *Green* and *Misses Cobbe.* Bristol Harbour, 1932, *Gibbons.*—S. America.

Var. ANGUSTIFOLIUM (Ludg.) Aellen. Avonmouth Docks, 1928, *S.*

Var. DEMINUTUM Ludwig. St Anne's, 1928, *Gibbons*, teste *Aellen.* This was a very beautiful bushy plant unlike any other *Ch. hircinum* form found here, with dark red stems, and small leaves of a dark bronze-green colour. Avonmouth Docks, 1928, *S.* This plant resembled the type in habit, with small green leaves, and a yellow-green stem. *Ch. hircinum* was not noticed here before 1916, but is now frequent.

Var. SUBTRILOBUM Issler. Ashton Gate, 1917, *S.* Eastville, 1921, *S.* St Anne's, 1921, *S.* and 1928, *Gibbons.*

CH. FICIFOLIUM Sm. Baptist Mills, 1902; waste ground, Portishead Pill, 1900-7, *White Fl.* Eastville, 1918, *Miss Roper.*—Europe, Medit. Reg.

Var. MICROPHYLLUM Murr. Edge of allotment, Ashton Gate, 1923, *S.*

CH. ACUMINATUM Willd. Bristol Harbour, 1931, *I. Evans.*—N. Temperate Asia.

CH. AMBROSIOIDES L. Fowl-run, Baptist Mills, 1911, *Miss Roper* in *White Fl.* St Philip's, 1922, *Gibbons.* A narrow-leaved form, Eastville, 1923, *S.* in *Rep. B.E.C.*, 1924.—Tropical America.

Var. SUFFRUTICOSUM Willd. Avonmouth Docks, 1930, *S.*

CH. VAGANS Standley. (CH. CHILENSE Schrad. non Pers.). St Philip's Marsh, 1919, *J. W. White* and *C. Bucknall*; *S.* This was recorded as *C. graveolens* Willd. in *Rep. B.E.C.*, 1919, and subsequently corrected.—Temperate S. America.

CH. MULTIFIDUM L. (ROUBIEVA MULTIFIDA Moq.). St Philip's Marsh, 1915, *S.* and *Green.* Portishead Dock, 1905-8, *White Fl.*—S. America.

MONOLEPIS NUTTALLIANA (R. et S.) Greene. Ashton Gate, 1917, *S.* Railway siding between Shirehampton and Avonmouth, 1917, *S.*—N. America.

BETA TRIGYNA Waldst. et Kit. St Philip's Marsh, 1908-11, *White Fl.*, and 1914, *White*; in 1916, *S.* Shirehampton, 1928, *S.* Crews Hole, 1930, *Evans.*—Hungary, Orient.

ATRIPLEX LITTORALIS L. Ashton Gate, 1917, *S.*—Europe, Asia, N. America.

A. PATULA L., var. BRACTEATA Westerlund. Bristol, *Druce* in *Rep. B.E.C.*, 1927.—The species occurs in Europe, Asia, N. Africa, N. America.

A. TATARICA L. St Philip's Marsh, 1915, *S.* and *Green*; 1916, *Druce.* Brislington, 1915, *Druce.* Avonmouth Docks, 1928, *S.*—Central Europe, Medit. Reg. to N. Asia.

Var. INTEGRIFOLIA Gürcke. Ashton Gate, 1917, *S.*

A. ROSEA L. St Anne's, 1915, *White*. Ashton Gate, 1922, *S*. Eastville, 1919, *White* and *Green*.—Central Europe, Medit. Reg.

AXYRIS AMARANTOIDES L. Ashton Gate, 1917, *S*. Shirehampton, 1919, *S*. Avonmouth Docks, 1929, *Gibbons*.—Russia, N. Asia.

KOCHIA SCOPARIA (L.) Schrad. Ashton Gate, 1922, *S*. Avonmouth Docks, 1928, *S*. and *Gibbons*.—Central Europe, Medit. Reg.

SALSOLA KALI L. Casual on ballast, Avonmouth Docks, 1930, *S*. Portishead Dock, 1906, *White Fl*.—Europe, Asia, N. Africa, N. America.

Var. TENUIFOLIA Tausch. (var. TRAGUS auct. angl. plur.). St Philip's, 1911, *White Fl*. Ashton Gate, 1917, *S*. and *Miss Roper*. Eastville, 1919, *S*.

POLYGONACEAE.

POLYGONUM CALCATUM Lindm. Avonmouth Docks, 1923, *Mrs Wedgwood* and *S*.—Europe.

P. PATULUM M. Bieb. (P. BELLARDI auct.). St Philip's, 1904, *White*. Baptist Mills, 1925, *S*. Ashton Gate, 1930, *S*. Avonmouth Docks, 1925, *S*.; 1928, *Gibbons*.—Central Europe, Medit. Reg.

P. PULCHELLUM Lois. Bedminster, 1930, *S*. Baptist Mills, 1931, *S*.—Medit. Reg.

*P. COGNATUM Meisn. Cranbrook Road, 1922, *Thompson*.—Orient.

P. CORRIGIOLOIDES Jaub. et Spach. Bedminster, 1926, *S*., compared at Kew.—Orient.

[P. PLEBEIUM R. Br. See *Rep. B.E.C.*, 1926, 131. Error; the plant is *P. corrigioloides*.]

P. CUSPIDATUM Sieb. et Zucc. Established between Shirehampton and Avonmouth, 1931, *S*.—N. and E. Temp. Asia.

FAGOPYRUM SAGITTATUM L. Common. "Sown as food for game," *White Fl*.—Central Asia.

F. TATARICUM (L.) Gaertn. Rubbish-tip, Horfield, 1917, *S*. Ashton Gate, 1924, and Bedminster, 1932, *S*.—N. and Central Asia.

RUMEX SANGUINEUS L. Several old localities in *White Fl*., and persisting by the Memorial Church, Victoria Square, Clifton.—Europe, Medit. Reg., N. Asia.

R. PULCHER L. Avonmouth Docks.—Europe, Medit. Reg.

R. PALUSTRIS Sm. (R. LIMOSUS auct. non Thuill.). Ashton Gate (var. **confertus* Schatz.), 1911, *White Fl*. Waste ground, Ashton Gate, 1930, *S*.—Europe, Temp. Asia.

R. MARITIMUS L. Baptist Mills, 1917, *S*. St Anne's, 1923, *S*.—Europe, Asia.

R. SALICIFOLIUS Weinm. First record, Baptist Mills, 1917, *S*. It has since been increasingly frequent at Bristol and Avonmouth.—N. America.

R. PATIENTIA L. Cranbrook Road, 1926, *Gibbons*. Avonmouth Docks, 1928, *S*.—Central Europe, E. Medit. Reg.

R. DENTATUS (L.) Campd., sub-sp. KLOTZSHIANUS Rech. Baptist Mills, 1925-6, and Bedminster, 1928, *S*., det. *Danser*.—Egypt, Orient.

Sub-sp. Halacsyi Rech. Avonmouth Docks, 1931, *S.*, det. *Danser.*

R. obovatus Danser. (R. paraguayensis Thell. non Parodi). Eastville, 1920, *S.*, see *Rep. B.E.C.*, 1923, 60-61. Avonmouth Docks, 1928, *S.* and *Gibbons.*—Holland.

R. cuneifolius Campd. (R. magellanicus of *Rep. B.E.C.* non Griseb.). Avonmouth Docks, 1923, *S.*—Temp. S. America. It has occurred also at Cardiff and at Glasgow.

*R. conspersus Hartm. (R. domesticus × obtusifolius). Portishead Docks, 1908, *Miss Roper.*—Europe.

SANTALACEAE.

Thesium, cf. ramosum Hayne. Baptist Mills, 1927, *S.*—Central and E. Europe, W. Asia.

EUPHORBIACEAE.

Euphorbia platyphyllos L. Redland, 1924, *Gibbons.*—Europe, Medit. Reg.

E. virgata Waldst. et Kit. Ashton Gate, 1928, *S.*—Central and E. Europe, N. and W. Asia.

Ricinus communis L. Railway siding between Shirehampton and Avonmouth, 1919, *S.*—Tropics.

Mercurialis annua L. Abundant about Bristol, *White Fl.* " A noxious weed at Bristol," *Bromfield* (1837).—Central Europe, Medit. Reg.

Var. ambigua (L.). Crews Hole, *Herb. Stephens* in *White Fl.* Ashley Hill, 1925, *S.* New road at Ashton Gate, 1906, *White Fl.*

URTICACEAE.

Cannabis sativa L. Common. The ♀ plant is less common than the ♂ and more glandular-hispid. Avonmouth Docks, 1928, *S.*—Asia. Cult.

Ficus Carica L. Growing from a wall of the Floating Harbour, Bristol Bridge, *White Notes Suppl. Fl.* Avonmouth Docks, established before 1928, *S.*—E. Medit. Reg.

Urtica urens L. Frequent on rubbish-tips.—Europe, Medit. Reg.

Helxine Soleirolii Req. In a drain at Long Ashton, 1923, *Miss Roper.* Wall at Pill, *Gibbons.*—Corsica, Sardinia.

LILIACEAE.

Asparagus officinalis L. " If not indigenous it must indeed be thoroughly naturalised in the vicinity of Bristol, having a continuous record of nearly 300 years," *White Fl.* Found by *Johnson* in " the marshes beyond Bristow " in 1634, and constantly recorded from the meadow below Cook's Folly and on the opposite side of the Avon. Still on slope of quarry under Leigh Woods, 1914, *S.*—Europe, Medit. Reg.

Asphodelus tenuifolius Cav. (A. fistulosus of *White Fl.* and many British authors). Frequent as a grain alien.—Central Europe, Medit. Reg.

Allium roseum L. and A. carinatum L., which were sown on St Vincent's Rocks, see *White Fl.*, persist there. *A. Dioscoridis Sibth. and Sm. (A. siculum Ucria) was also recorded from there in *White Fl.*; still there about 1919, *Airy-Shaw*.

COMMELINACEAE.

*Commelina communis L. Avonmouth Docks, 1931, *Evans* and *Gibbons*.—Tropics.

JUNCACEAE.

Juncus macer Sm. (J. tenuis auct. angl.). First noticed along the tow-path by the Avon under Leigh Woods, and along paths in the woods, August 1914, *S*. Increasing there in 1932. Avonmouth Docks, 1927, *Miss Roper*.—America.

PALMACEAE.

Phoenix dactylifera L. Seedlings from the date are common on the rubbish-tips.—N. Africa, Orient.

CYPERACEAE.

Cyperus difformis L. Near Kingswood, 1932, *S*.—A rice alien, introduced into Italy and the Balkans with rice. Native of the old-world tropics.

Scirpus Holoschoenus L. Avonmouth Docks, one small clump first noticed in October 1927, *S*.; still there and stronger, 1932. It occurs on the other side of the Channel at Barry Docks.—Europe, Medit. Reg., N. Asia.

Carex vulpinoidea Michx. Avonmouth Docks, 1932, *Gibbons*.—N. America. Previously recorded from Britain as an outcast on the Thames bank at Kew.

GRAMINEAE.

Panicum miliaceum L. Rather common.—India, and Cosmopolitan.

P. capillare L. Rubbish-tip, Eastville, 1916, *White*. Railway bank, Ashley Hill, 1931, *S*. Avonmouth Docks, 1930, *S*. Frequent.—N. America.

Echinochloa Crus-galli (L.) Beauv. Rather common, and very variable.—Cosmopolitan.

Var. breviseta Döll. Bedminster, 1930 (some plants awnless), *S*.

Var. longiseta Döll. Bedminster, 1932, *S*. Avonmouth Docks, 1931, *S*.

E. frumentacea Link. Wee Lane, 1930, *Gibbons*. Avonmouth Docks, 1927-30, *S*.—India, China and Japan.

E. Crus-pavonis Stapf. Cranbrook Road, 1924, *Gibbons*.—Trop. Africa and S. America.

E. colonum Link. Avonmouth Docks, 1926, *S*.—Cosmopolitan.

SETARIA ITALICA (L.) Beauv. Eastville, 1916, *White*. St Philip's Marsh, *S*. St Anne's, 1925, *Gibbons*. Avonmouth Docks, 1930, *S*.—Cult. India-Japan and elsewhere.

S. MACROSTACHYS H. B. K. Avonmouth Docks, 1930, *S*.; det. *Hubbard*.—S. United States and Mexico.

S. VIRIDIS (L.) Beauv. Rather common since 1881 (see *White Fl.*).—Cosmopolitan in N. Temp. Zone.

Var. WEINMANNI R. et S. Bristol Harbour, 1932, *Gibbons*. Ashley Hill, *S*.

S. GLAUCA Beauv. Frequent.—Cosmopolitan, in N. Temp. Zone.

S. GENICULATA (Lam.) Beauv. Eastville, 1918, *S*.; this is the *S. ambigua* of *Rep. B.E.C.*, 1918, 311. Avonmouth Docks, 1928, *S*. and *Gibbons*.—N. and S. America.

S. VERTICILLATA (L.) Beauv. Eastville, 1917, *S*. Bedminster and Ashley Hill, *S*. Avonmouth Docks, 1926 and subsequently, *S*.—Cosmopolitan.

[S. AMBIGUA Guss. First British record, *Rep. B.E.C.*, 1918, 311. Error, see *S. geniculata*.]

PASPALUM DILATATUM Poir. Avonmouth Docks, 1932, *Gibbons*.—S. America. Introduced elsewhere.

P. RACEMOSUM Lam. Ashton Gate, 1922, *S*.—S. America.

ERIOCHLOA VILLOSA Kunth. Avonmouth Docks, 1930, *S*.—China, Japan.

DIGITARIA SANGUINALIS (L.) Scop. Garden weed, Redland, 1881, *White Fl.* Rubbish-tip, Eastville, 1916, *White*. Brislington, *Misses Cobbe*. Bristol Harbour, 1932, *Gibbons*. Ashley Hill, *S*. Avonmouth Docks, 1931, *S*.—Central Europe, Medit. Reg., N. America.

SPARTINA TOWNSENDII H. & J. Groves. First noticed in very small tufts on the mud beyond the Shipping Dock at Avonmouth, 1930, *S*. and *Miss Vivian*. Established, and increasing, 1932.—England, N. France.

ZEA MAYS L. Frequent on rubbish tips and docks.—Cult. throughout the warmer parts of the world.

BECKMANNIA ERUCIFORMIS Host. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce*. St Anne's, 1930, *Evans*. Bedminster, 1922, *S*. Avonmouth Docks, 1930, *S*.—South Europe, S.W. Asia.

ELEUSINE INDICA Gaertn. Avonmouth Docks, 1926 and 1930, *S*.—Throughout Tropics.

SORGHUM HALEPENSE (L.) Pers. Bristol Harbour, 1932, *Gibbons*. Ashley Hill, 1932, *S*. Avonmouth Docks, 1927, *Gibbons*.—Medit. Reg. to N.W. India. Introduced into many parts of world.

PHALARIS MINOR Retz. St Philip's Marsh, 1911, *Miss Roper*; Baptist Mills, 1911, *Miss Roper*; Portishead Dock, 1904, *White Fl.* Now frequent as a grain alien.—Medit. Reg., India, S. Africa, etc.

P. CAERULESCENS Desf. (P. AQUATICA Druce, List). St Anne's, 1927, *Gibbons*. Bedminster, 1930, *S*. Baptist Mills, 1927, *S*.—Medit. Reg.

P. CANARIENSIS L. A frequent grain casual.—Cult. in warm regions.

P. BRACHYSTACHYS Link. Baptist Mills, 1928, *S.* Bedminster, 1930, *S.*—Medit. Reg.

P. PARADOXA L. St Philip's Marsh, 1903; Portishead Dock, 1908, *White Fl.* Frequent in many places.—Medit. Reg.

P. ANGUSTA Nees. St Philip's Marsh, 1915, *Green.* Cranbrook Road, 1925, *Gibbons.* Wee Lane, 1927, *S.* Bedminster, 1928, *S.* Avonmouth Docks, 1928, *S.*—S. America.

ANTHOXANTHUM ARISTATUM Boiss. Wee Lane, 1926, *Gibbons.*—Medit. Reg.

ALOPECURUS MYOSUROIDES Huds. Common.—Europe, Medit. Reg.

STIPA HYALINA Nees. Bedminster, 1928, *S.*, det. *Hubbard.*—Temp. S. America.

ORYZOPSIS MILIACEA (L.) Aschers. & Schweinf. (PIPTATHERUM MULTIFLORUM (Desf.) Beauv.). Baptist Mills, 1927, *S.* Avonmouth Docks, 1931, *S.*—Medit. Reg.

*PHLEUM GRAECUM Boiss. & Heldr. St Philip's Marsh, *Misses Cobbe* and *Druce* in *Rep. B.E.C.*, 1916.—Greece, Asia Minor.

P. HIRSUTUM Sut. (P. MICHELII All.). St Philip's Marsh, 1899-1906, *White Fl.* Portishead Station-yard, 1906-7, *Miss Livett* in *White Fl.* Kingswood, 1918, *S.* Baptist Mills, 1929, *S.* Railway siding between Shirehampton and Avonmouth, 1918, *S.*—Central and S. Europe.

P. PANICULATUM Huds. (P. ASPERUM Jacq.). Kingswood, 1918, *S.* "Mr Druce has a note that George Don got *P. paniculatum* at Bristol in 1787," *White Fl.*—Central and E. Europe, W. Asia.

P. SUBULATUM A. & G. (P. TENUE Schrad.). St Philip's Marsh, 1913, *S.* Baptist Mills, 1923, *S.* Avonmouth Docks, 1931, *Gibbons.*—Medit. Reg.

[AGROSTIS SEMIVERTICILLATA (Forsk.) C. Christ. (A. VERTICILLATA Vill.). Banks of Avon, Avonmouth, *Miss A. B. Cobbe* in *Rep. B.E.C.*, 1916. Doubtful. This was probably the variety CONDENSATA Hack. of A. STOLONIFERA.]

A. STOLONIFERA L. (A. ALBA L.), var. GIGANTEA Koch. Avonmouth Docks, 1931, *S.*—Europe, Medit. Reg., N. Asia, N. America.

A. HYEMALIS (Walt.) B. S. P. Avonmouth Docks, 1928-30, *S.* and *Gibbons.*—N. America.

POLYPOGON MONSPELIENSIS Desf. Black Rock Quarry, on dredgings from the Avon, 1883; St Philip's Marsh, 1904, *White Fl.* Frequent now as a casual.—Medit. Reg.

P. LUTOSUS (Poir.) Hitchc. (P. LITTORALIS Sm.). St Philip's Marsh, 1875; Black Rock Quarry, 1883, *White Fl.* Eastville, 1918, *S.* Bristol, W. Glos., *Misses Cobbe* in *Rep. B.E.C.*, 1918.—Medit. Reg.

GASTRIDIUM VENTRICOSUM (Gouan) S. & T. On dredgings in the Black Rock Quarry, 1883; St Philip's Marsh, 1889, *White Fl.*, and in 1916, *Misses Cobbe.* Ashley Hill, 1931, *S.* This species is native on the limestone at Clifton.—England, France, Medit. Reg.

APERA SPICA-VENTI (L.) Beauv. Kingswood, 1882; St Philip's Marsh, 1888; Portishead Station-yard, 1904, *White Fl.* St Philip's Marsh, 1916, *Misses Cobbe.* Cranbrook Road, *S.* Avonmouth Docks, *S.*—Europe, N. Asia.

A. INTERRUPTA Beauv. St Philip's Marsh, 1904-9, *White Fl.* Correctly named; but the plant recorded from Stapleton Road Gasworks, 1911, *S.*, was misidentified, being *Polypogon monspeliensis.*—W. and Central Europe, Medit. Reg.

AVENA FATUA L. About Bristol, frequent, *White Fl.*—Europe, Asia, Africa.

Var. GLABRATA Peterm. Avonmouth Docks, 1932, *S.*

Var. PILOSISSIMA S. F. Gray. Kingswood, 1932, *S.*

× SATIVA Hack. = *MARQUANDII Druce in British Plant List, ed. 2. St Philip's Marsh, 1919, *Druce.*

A. STRIGOSA Schreb. Eastville, 1918, *Miss Roper.* St Anne's, 1930, *S.* Shirehampton, 1919, *S.*—N. and Central Europe, W. Asia.

A. SATIVA L. St Philip's Marsh, 1916, *Miss Cobbe.* Common.—Cult.

GAUDINIA FRAGILIS (L.) Beauv. Waste ground, Bedminster, 1928, *S.*—Medit. Reg.

CYNODON DACTYLON (L.) Pers. Baptist Mills, 1925, *S.* Avonmouth Docks, 1930, *S.*—Cosmopolitan.

*ECHINARIA CAPITATA (L.) Desf. St Philip's Marsh, 1909, *White Fl.*—Medit. Reg.

CYNOSURUS ECHINATUS L. A frequent casual in the area.—Medit. Reg.

KOELERIA PHLEOIDES Pers. St Philip's Marsh, 1902, *White Fl.*; 1916, *Misses Cobbe.* Bedminster, 1930, *S.* Portishead Station-yard, 1906-7, *White Fl.*—Medit. Reg.

*ERAGROSTIS CILIANENSIS (All.) Vig.-Lut. Wee Lane, 1929, *Gibbons.*—Medit. Reg., Trop. and S. Africa, India.

E. POAEOIDES Beauv. (E. MINOR Host). Wee Lane, 1925, *Gibbons.* Avonmouth Docks, 1930, *S.*—Medit. Reg., India, N. Asia, Trop. Africa.

E. BARRELIERI Daveau. Avonmouth Docks, 1926, *S.*—Medit. Reg., Trop. Africa.

E. PILOSA Beauv. Bristol Harbour, 1932, *Gibbons.* Avonmouth Docks, 1926, *S.*—Tropics.

*DESMAZERIA LOLIACEA (Huds.) Nym. St Philip's Marsh, *Misses Cobbe* in *Rep. B.E.C.*, 1916.—Britain, W. France, Medit. Reg.

*BRIZA MINOR L. St Philip's Marsh, 1889, *White Fl.* St Vincent's Rocks, *Bot. Guide* (1805), see *White Fl.* where mention is made of a specimen in Herb. Brist. Nat. Soc. collected by Dr Dyer in the same locality.—Medit. Reg. (colonist in S.W. England).

*B. MAXIMA L. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.*—Medit. Reg.

POA PALUSTRIS L. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.* Eastville, 1917, *S.* Bedminster, 1922, *S.* Frequent at Avonmouth Docks, *S.*—N., Central and E. Europe, N. and W. Asia, N. America.

Var. EFFUSA (Kit.) Asch. et Graebn. Avonmouth Docks, 1932, *S.*

*FESTUCA MEMBRANACEA (L.) Druce. (F. UNIGLUMIS Sol.). St Philip's Marsh, *Druce* in *Rep. B.E.C.*, 1916.—W. Europe, Medit. Reg.

F. MYURUS L. Common.—Europe, Medit. Reg., S. Africa, Australia, America.

BROMUS GUSSONEI Parl. (B. MAXIMUS Desf., auct.). St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, 1926-30, *S.* and *Evans.* —W. Europe, Medit. Reg.

B. RIGIDUS Roth. St Philip's Marsh, 1916, *Misses Cobbe* and *S.*—Medit. Reg.

B. TECTORUM L. St Philip's Marsh, 1916, *Misses Cobbe.* Avonmouth Docks, 1926-30, *S.* Portishead Station-yard, 1904-7, *White Fl.* —Medit. Reg.

Var. LONGIPILUS Borbas. Avonmouth Docks, 1932, *Evans* and *S.*

B. RUBENS L. St Philip's Marsh, 1917, *S.* Avonmouth Docks, 1932, *Gibbons.*—Medit. Reg.

B. INERMIS Leyss. Ashton Gate, 1926, *S.* Bristol Harbour, 1932, *Evans.* Avonmouth Docks, 1926, *S.*—Central Europe, Medit. Reg.

B. UNIOLOIDES H. B. K. One of the commoner alien grasses.—S. America.

*B. BRIZAEFORMIS Fisch. et Mey. Bristol, *Mrs Wedgwood* in *Rep. B.E.C.*, 1918, 409.—Orient.

B. SECALINUS L. Rather common. "St Philip's Marsh for 30 years," *White Fl.*—Europe, Medit. Reg., N. Asia.

Var. VELUTINUS (Schrad.) Koch. Quarry at top of Pembroke Road. Clifton, 1904, *Bucknall* in *White Fl.* Brislington, 1916, *Misses Cobbe.* Eastville, 1917, *S.* Not infrequent.

Var. SUBMUTICUS Reichb. St Anne's, 1930, *S.*, det. *Hubbard.*

B. MOLLIFORMIS Lloyd. Avonmouth Docks, 1927, *S.*—W. and S. Europe.

B. INTERRUPTUS Druce. Avonmouth Docks, 1930, *S.*—England.

B. LEPIDUS Holmb. (B. BRITANNICUS I. A. Williams). Avonmouth Docks, 1929, *S.*—N.W. Europe.

B. ARVENSIS L. Bank of Avon under Clifton Downs, 1880; dredgings in Black Rock Quarry, 1883; Quay near Princes Street, 1882, *White Fl.* Bedminster, 1922, *S.* Avonmouth Docks, 1926-32, *S.*—Europe, Medit. Reg.

B. JAPONICUS Thunb. (B. PATULUS M. et K.). St Vincent's Rocks, 1869, *Dyer* in *White Fl.* St Philip's Marsh, 1904, *White Fl.*; 1922, *S.* St Anne's, 1931, *Evans.* Bedminster, 1930, *S.* Avonmouth Docks, 1931, *Gibbons.* Portishead Dock, 1907, *White Fl.* Very similar to *B. arvensis*, but distinguished by the very short anthers.—Europe, Temp. Asia.

*B. SQUARROSUS L. Avonmouth, *Evans* in *Rep. B.E.C.*, 1931, teste *Howarth.* No specimen seen in *Herb. Evans.*—Central Europe, Medit. Reg.

LOLIUM PERENNE L., var. *COMPOSITUM Sm. Kingswood, 1931, *Evans.*—The species, Europe and Medit. Reg.

L. TEMULENTUM L. Rather frequent.—Medit. Reg.

Var. ARVENSE L. St Philip's Marsh, 1902, *White Fl.*; 1916, *Misses Cobbe*. Avonmouth Docks, 1928, *S.*

Var. LEPTOCHAETON A. Br. Avonmouth Docks, 1930, *S.*, det. *Hubbard.*

L. MULTIFLORUM Lam. Common.—Medit. Reg.

Var. ITALICUM A. Br. Common.

Var. COMPOSITUM (Thuill.) Mutel. Near Shirehampton, 1918, *Lady Davy* and *S.*

Var. MUTICUM DC. St Anne's, 1931, *Evans.*

AGROPYRUM TRACHYCAULUM (Link) Malte. (A. TENERUM Vasey). Avonmouth Docks, 1926-30. *S.*—N. America, an important fodder-grass.

SECALE CEREALE L. Very common.—Cult.

TRITICUM AESTIVUM L. Common.—Cult.

*AEGILOPS OVATA L. St Philip's Marsh, 1919, *Misses Cobbe* and *Druce.* —Medit. Reg.

A. TRIARISTATA Willd., with var. MACROCHAETON Hack. In Portishead Station-yard, 1906, *Miss Roper.*—Medit. Reg.

A. CYLINDRICA Host. St Philip's Marsh, 1919, *Misses Cobbe* and *Druce.* Brislington, 1921, *Miss Roper.* Avonmouth Docks, 1928, *S.*—Italy and E. Europe.

A. VENTRICOSA Tausch. St Philip's Marsh, 1904, *White Fl.*; 1919, *Misses Cobbe* and *Druce*; 1922, *S.* Avonmouth Docks, 1928, *S.* and *Gibbons.* Portishead Dock, 1906-7, *White Fl.*—Spain, N. Africa.

A. BICORNIS Forsk. St Anne's, 1926, *S.*—N.E. Africa, Orient.

HORDEUM MARINUM Huds. (H. MARITIMUM With.). St Philip's Marsh, 1916, *S.* and *Druce.*—Europe, Medit. Reg.

H. COMPRESSUM Griseb. Avonmouth Docks, 1930, *S.* and *Gambier-Parry.* —Argentina.

H. JUBATUM L. St Philip's Marsh, 1914, *S.*, first record in *White Notes Suppl. Fl.* It has since become frequent on tips and docks.—N. America.

H. TRIFURCATUM Jacq. Brislington, 1923, *Gibbons.*—N. India and Cult.

H. HEXASTICHON L. and H. DISTICHON L. Avonmouth Docks, 1932, *Evans.*—Cult.

ELYMUS CAPUT-MEDUSAE L. St Philip's Marsh, 1900 and 1904, *White Fl.* Bristol, 1920, *Evans.* Bedminster, 1930, *S.*—Medit. Reg.

E. CANADENSIS L. St Philip's Marsh, 1916, *Misses Cobbe* and *Druce.* Bedminster, 1922, *S.* St Anne's, 1929, *Gibbons* and *Evans.*—N. America.

THREE HYBRID ORCHIDS: 1931.

P. M. HALL.

Reproduced by kind permission from the Report of the Winchester College Natural History Society for 1927-31.

I. HABENARIA GYMNADENIA Dr. × ORCHIS PRAETERMISSA Dr. = × × ORCHIGYMNADENIA WINTONI A. Camus. (Plate I.)

Three specimens of this hybrid were found in a marshy meadow near Southwick, Hants, in June 1931.

Description.—Plants about 35 cm. in height: inflorescence 7 cm. in length, rather lax, cylindrical: leaves few, narrow and slightly carinate: sepals averaging 7 mm. in length, rather erect as in *O. praetermissa* but with the margins rolled back in the manner of *H. Gymnadenia*: labellum 5 to 6 mm. in length by 6 to 7 mm. in width, rhomboidal in outline, margins entire, three-lobed with protruding mid-lobe, rose purple in colour, marked with a faint dot pattern with a conspicuous white " eye " at the base: spur, nearly 5 cm. in length from base of labellum, slender, slightly curved: anthers and rostellum as in *Orchis*: scent, distinct scent of *H. Gymnadenia* but not strong.

This is a very beautiful plant and a perfect intermediate between its two parents. The general appearance of the plant is similar to that of *O. praetermissa* with its lip-pattern of dots and protruding mid-lobe of the labellum, but the presence of *H. Gymnadenia* is clear from the narrower leaves, smaller flowers, rolled edges of the sepals, long slender spur, slight scent and in general its more slender and refined appearance.

I have thought it desirable to describe this plant in some detail as it may possibly be the first time that this hybrid has been recorded with certainty. A plant found near Winchester in 1914 was so described rather tentatively and without complete conviction by Dr Druce in the Win. Coll. N.H.S. Report for 1913-15, p. 12, and Miss Corfe's drawing of that plant is reproduced in the Frontispiece of that Report. Miss Corfe has also made a very beautiful drawing of the plant discovered this year, and from the photograph of that drawing there will be seen to be no doubt as to the plant's parentage. All three specimens were identical. Colonel Godfery has no hesitation in agreeing with the identification.

As to nomenclature, the 1914 plant was named by Dr Druce × *H. Wintoni*, but he has since re-christened it ×*H. Quirkiana*. According to Continental practice, however, bigeneric hybrids are given a generic name compounded of the two names of the genera of the hybrid, and Mdlle. A. Camus has described this plant as × × *Orchigymnadenia Wintoni*. It is recorded from no other station except Southwick and possibly Winchester if the 1914 plant was rightly identified.

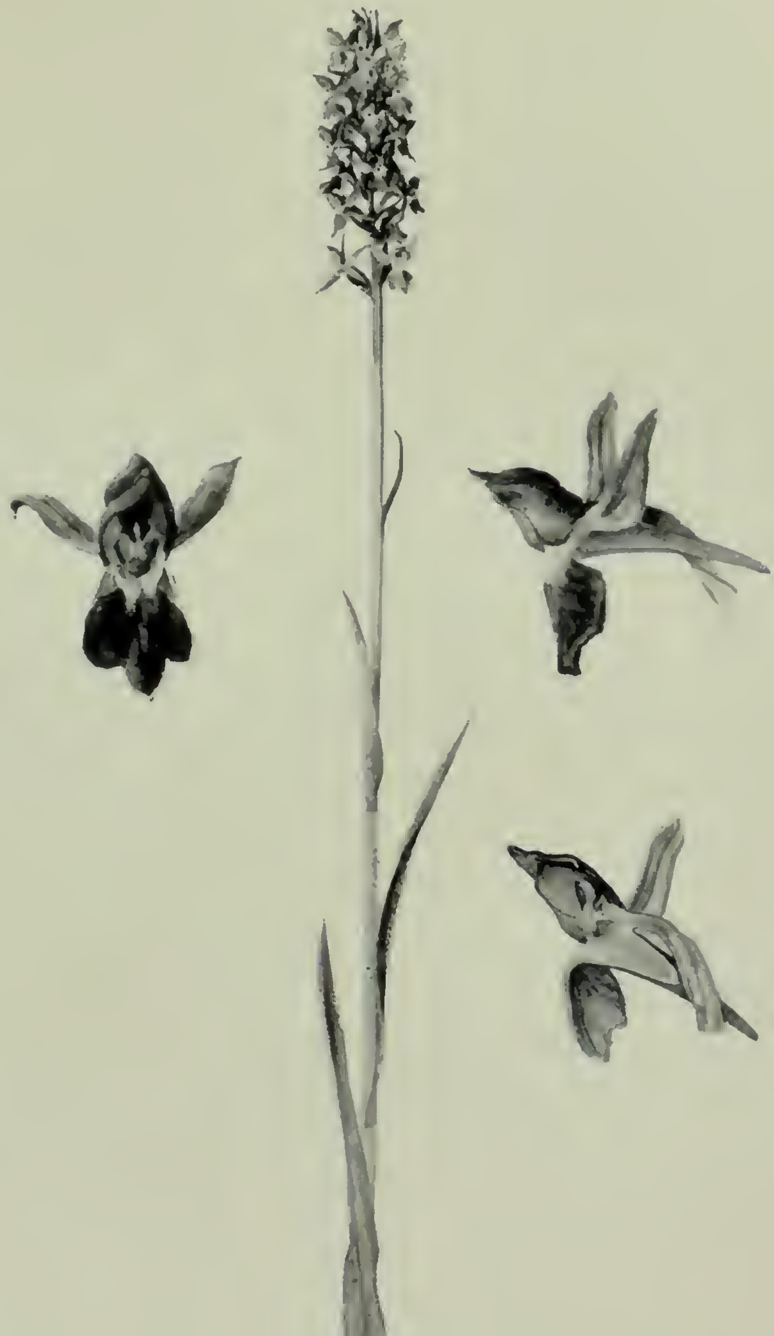

Plate 1.
H. GYMNADENIA × O. PRAETERMISSA.
From a water-colour by Miss Corfe.

[illegible]

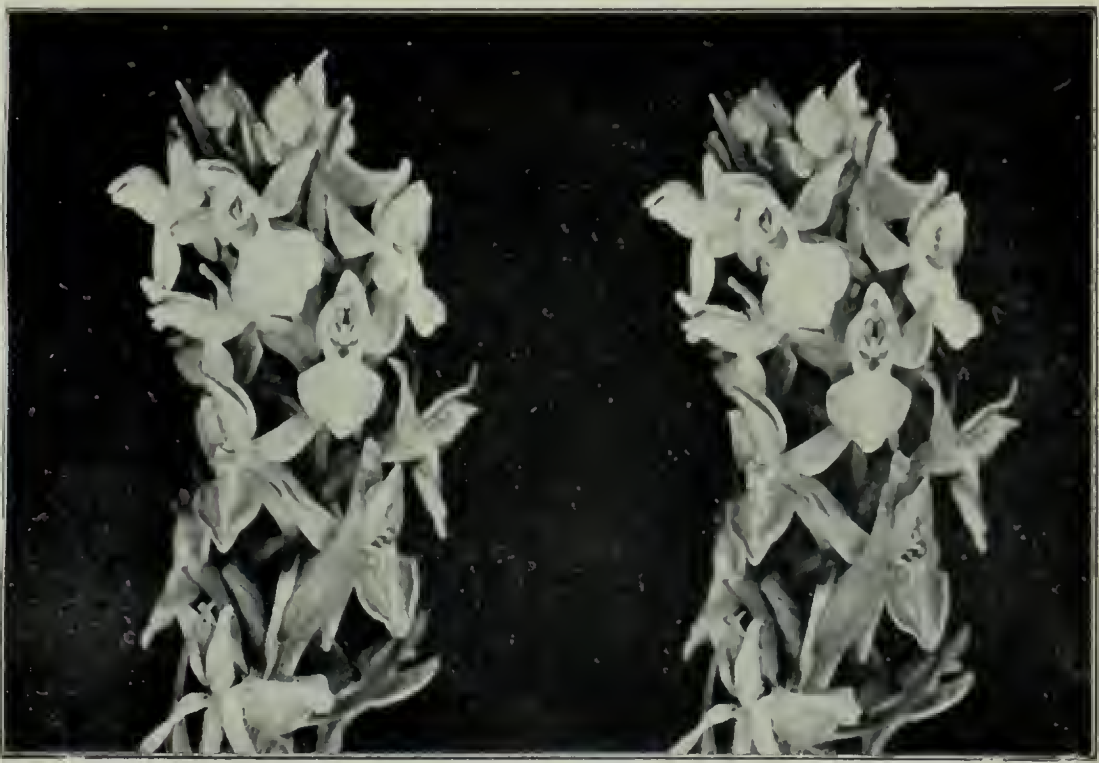

Plate 1A.
H. GYMNADENIA × O. PRAETERMISSA.

[illegible]

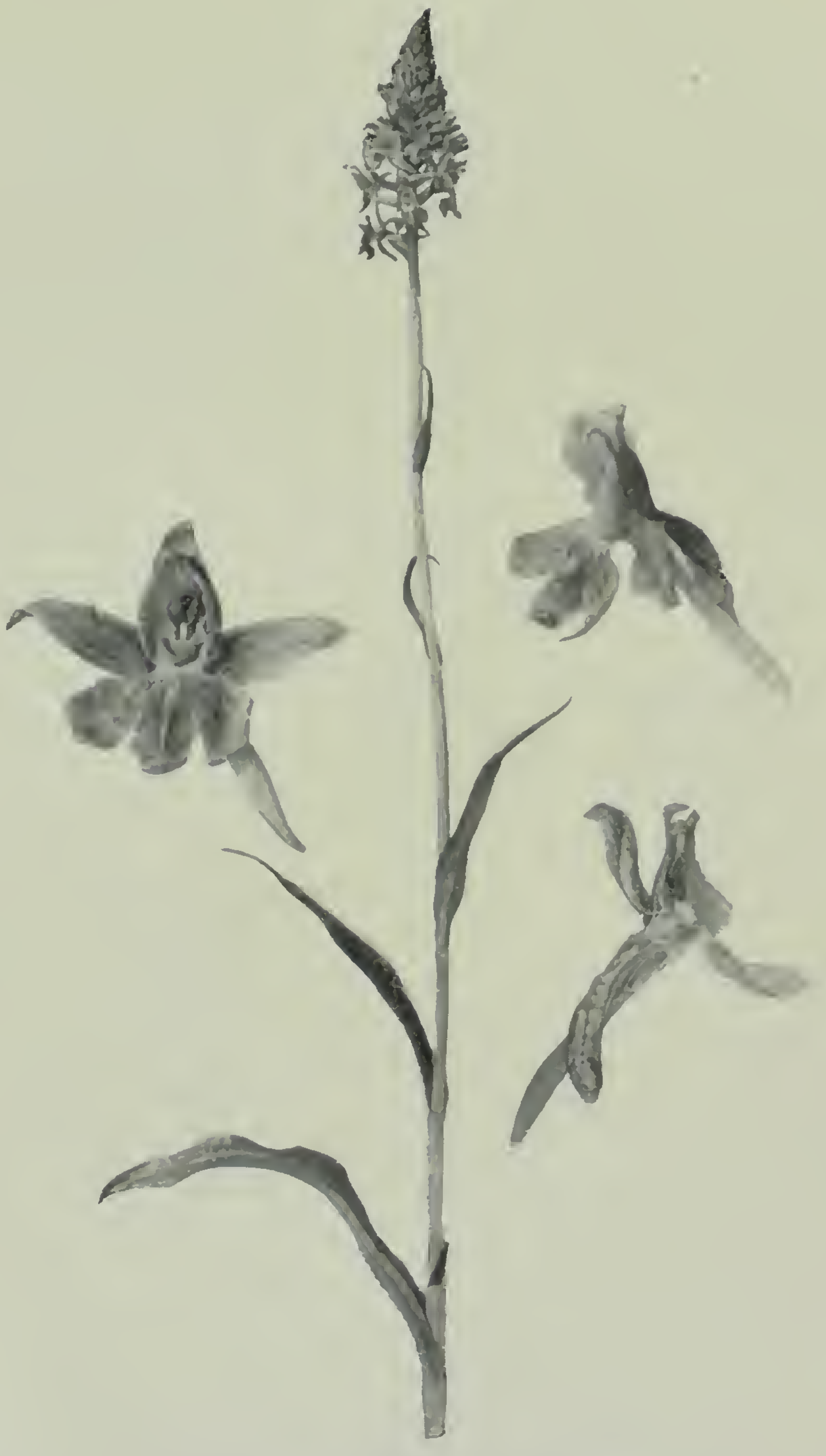

Plate 2.
H. GYMNADENIA × O. FUCHSII.
From a water-colour by Miss Corfe.

[illegible]

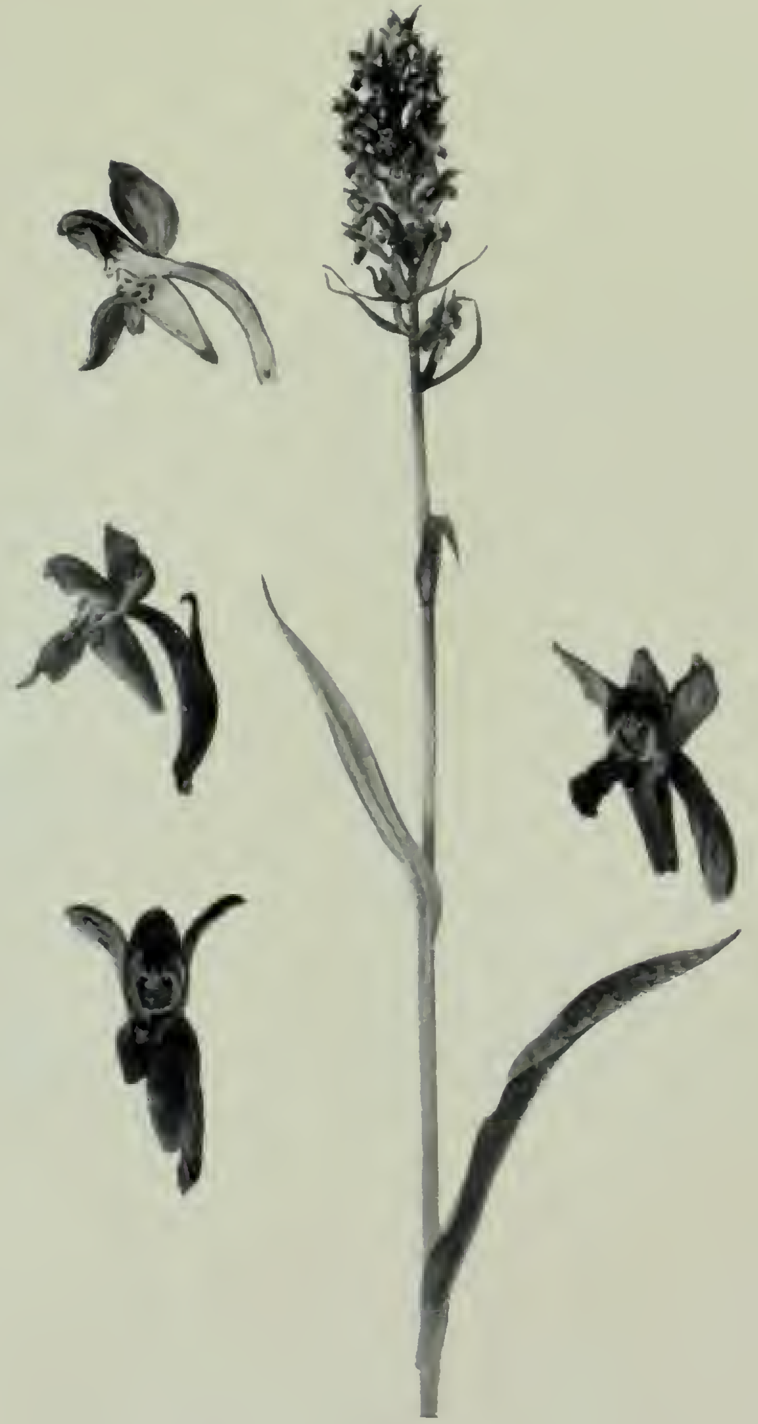

Plate 3.
O. FUCHSII × O. INCARNATA.
From a water-colour by Miss Corfe.

[illegible]

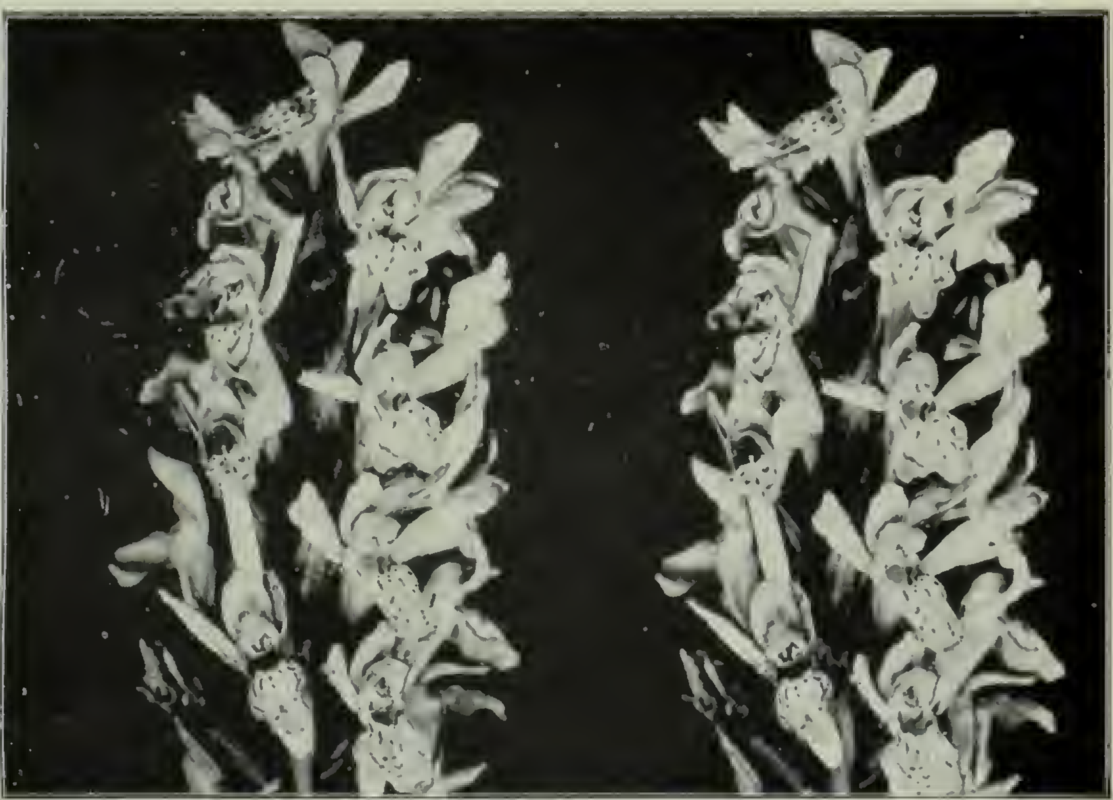

Plate 3A.
O. FUCHSII × O. INCARNATA.

[illegible]

II. HABENARIA GYMNADENIA Dr. × ORCHIS FUCHSII Dr. = ×× ORCHIGYMNADENIA HEINZELIANA G. Camus. (Plate II.)

A very fine example of this hybrid was found in a wet meadow at Rudley Mill near Hambledon, Hants, in company with great numbers of both parents and many other species of Orchids. The influence of *O. Fuchsii* is seen in the conical inflorescence, deeply trifid labellum incised at the edges and with deeper markings in the form of suffused streaks rather than spots, and heavily spotted leaves. The presence of *H. Gymnadenia* is shown by the rolled-back edges of the sepals, long slender spur exceeding the ovary and distinct scent.

This specimen, though of course much more luxuriant, is otherwise very similar to that found on Cheesefoot Head by R. M. Synge in 1930.

Continental botanists name two forms of this hybrid: one, in which *O. Fuchsii* predominates, is ×× *Orchigymnadenia Heinzeliana* G. Camus, and this specimen would appear to belong here: the other in which *H. Gymnadenia* influence prevails is ×× *Orchigymnadenia Legrandiana* G. Camus. The plant figured opposite p. 10 in the 1913-15 Win. Coll. N.H.S. Report would, judging from the photograph, appear to belong to the latter type. As, however, hybrids must by their very nature be variable, there seems to be little value in attaching names to the several variants.

III. ORCHIS FUCHSII Dr. × O. INCARNATA L. (Plate III.)

At Southwick occurred an extremely interesting group of hybrids which showed partial degeneration. *O. incarnata* type has not been seen by me at Southwick, but nevertheless these hybrids, from the very erect sepals, wide throat and short, thick spurs, must contain *incarnata* blood. The reproduction of Miss Corfe's drawing of one of these plants clearly indicates these characters and the general resemblance of the plant to *incarnata* in habit. There were about a dozen plants in all, and all were practically identical except that whereas most of them had the leaves marked with faint ring-spots, a few had unspotted leaves. This fact again is evidence for hybridity between two parents, one with spotted, the other with unspotted leaves.

Still greater interest attaches to these plants from the manner in which the petals were partially degenerate. The labella varied from a complete three-lobed labellum to a simple strap-shaped petal with numerous intermediate forms. In many cases the lateral petals showed at their outer margins anther cells, giving them a very curious swollen appearance. It will be seen the degeneration here had not proceeded so far as in the case of the specimens of *H. Gymnadenia* described by J. N. Mills in Win. Coll. N.H.S. Report for 1927-31, pp. 16-17. In this case the petals and a^1 and a^2 anthers are seen side by side but still fused together; in the other case the petals have disappeared altogether, leaving only the anthers visible.

Colonel Godfery has seen a specimen of this plant and agrees that one parent must be *O. incarnata* L. He thinks however that the other is more probably *O. latifolia* L.: he bases this view no doubt on the ring-spotted leaves and heavy markings on some of the labella suggesting loop-patterns. While it would not be safe to reject this identification entirely, I prefer for the present to call this plant *O. Fuchsii* Dr. × *O. incarnata* L., as *O. latifolia* is not yet known with certainty to occur in this locality where *O. Fuchsii* does, also *praetermissa* and hybrids between them.

Later Note.—I am informed by Rev. R. Quirk that during the summer of 1932 one undoubted example of the hybrid referred to as No. I above occurred on the downs near Winchester and was confirmed by the authorities at Kew, and no less than 11 examples of No. II. Plants of No. III were again seen at Southwick maintaining their characters.

REVISED NOMENCLATURE OF SALIX.

J. FRASER.

During the past summer Björn Floderus, M.D., of Stockholm, paid a visit to London, and for some weeks was engaged in the revision of the Salices in the Herbarium of the Royal Botanic Gardens, Kew; the Museum, Natural History, South Kensington; and the Linnean Herbarium, Burlington House, Piccadilly. Incidentally, various private collections were submitted to him, during his stay, and I had three interviews with him when I showed him all my doubtful and critical specimens, some of which have always been subjects of controversy amongst botanists generally for many years past. The results in several cases were surprising and not a little disconcerting concerning names that have been cherished as indisputable and used in British floras and other publications since the time of Linnaeus. Björn Floderus has been studying the Salices of the world for the last fifty years and has an immense herbarium of them. In the revision of the British herbaria he got through about a hundred a day, but being unable to complete his studies he promised to pay a second visit next summer. I propose to deal only with the Willows in my own collection, which are fairly comprehensive for the British species and hybrids, though doubtless incomplete in the case of the rarer hybrids.

Salix undulata Ehrh. (*S. lanceolata* Sm).—The chief dispute about this has been concerning the parentage. Wimmer Flora, 1849. p. 39, and Denkschr., 1853, p. 157. published it as *S. triandra-viminalis*. This parentage was accepted by Andersson, Monog., 1865, p. 28, Dr F. B. White, Revision, p. 355, A. et E. G. Camus, Monog. de Saules de France, p. 251, and by Dr Floderus. More than one of these salicologists got the idea that *S. undulata* had a pubescent ovary, but Smith who had seen some of the original specimens of Ehrhart's Willow declared that the specimens seen by him had glabrous ovaries. That is correct in the case of the catkins produced normally in spring. The hybrid often produces catkins in July and August, when the catkins are terminal and leaves, bracteoles, and ovaries are altogether abnormal. The last named are pubescent on the upper half. Wimmer in Sal. Eur., 1866, p. 144, changed his mind about the parentage of this Willow and wrote it *S. triandra-alba*, while E. F. Linton, Monog., p. 20, adopted *S. alba* × *triandra*, but this parentage does not account for the length of the style in ×*S. undulata*.

S. alopecuroides Tausch.—This hybrid was described as a species by Tausch, Ind. hort Canal., 1821, et Plant. Select. Bohemiae. It is also the *S. speciosa* Host Sal., p. 5. Most salicologists seem agreed about the parentage, though Wimmer named it *S. amygdalina-fragilis* in 1848, and *S. fragilis-triandra* in 1853. It is a variable hybrid on the Continent and Kerner described two other forms besides the type, but I have seen only the type in this country and that is always male, and notable for the showy character of the large catkins, the bracteoles of which are densely covered in the early stages with long yellowish hairs. Many of the catkins are forked and the stamens on some trees vary from two to five, and are sometimes monoecious, rarely hermaphrodite. I submitted dried and living specimens with stipules to Dr Floderus, but he could see no *S. triandra* in them. He asked if it was a cultivated tree and I said I believed it was a planted one, since I had seen it from Kent and Surrey to Perthshire and the Moray Firth, all so uniform that they might have been pieces taken from one tree. He promptly wrote *S. alba* × *fragilis*, f. *monstrosa* ♂ on a label and attached it to one of my sheets.

S. pruinosa Wendl.—Though not a British Willow, this has long been recorded from Yorkshire, and in recent years its cultivation has been greatly extended for its ornamental value. Dr Floderus referred it back to the oldest name, *S. acutifolia* Willd. Sp. 28. As I have distributed it more than once under Wendland's name, I desire to record the change.

S. pulchra Wimm. et Krause.—Dr Floderus does not agree that this is a species. De Candolle in his Prodromus says it does not differ from *S. daphnoides*, but the former authority says it is the hybrid, *S. acutifolia* × *daphnoides*.

S. purpurea L., var. *Eugenei* Fraser.—I am responsible for publishing the description of a Willow under the above name in Rep. B.E.C., 723, 1931. I found it in cultivation under three erroneous names, and may have been relying too much on the brief description of A. and E. G. Camus, i, p. 104, and their Atlas, Pl. 7, fig. f., which gave the name, *S. purpurea* L., var. c. *Helix* Koch. This is not at all like *S. Helix* Sm., a much older name. The Willow in question is a hybrid, namely, *S. purpurea* × *viminalis*, most closely allied to *S. rubra* Huds., but perfectly distinct in its much narrower leaves. They vary greatly in size according to the vigour of the bush or small tree, but in the garden they can attain a length of 11 cm. or more and a width of 18 mm. at the widest part. They dry perfectly green by the end of September. There is a considerable amount of pubescence on the unfolding leaves and the young shoot, but it falls away very quickly, leaving the plant glabrous, whereas *S. rubra* Huds. usually has some persistent pubescence. The hybrid Willow may be named *S. purpurea* × *viminalis*, var. *Eugenei* Fraser.

×*S. stipularis* Sm.—My sheet of this was confirmed by Dr Floderus as *S. stipularis* Sm. who first described it in Fl. Brit., iii, 1069. It is much more common in Scotland than in the south, and Dr F. B. White found a bush of the ♂ plant near Perth, though Wimmer in his day said that it was then unknown.

×*S. acuminata* Sm.—Dr Floderus has referred this Willow back to *S. dasyclados* Wimm. as a species. Wimmer first described it in Regensb. Flora, 1849, Nr. 3, though in his Salices Europeae, p. 42 (1866) he adopted the name *S. longifolia* Host Sal., p. 19. In the same publication, curiously enough, he published all the British specimens of *S. acuminata* Sm. under the name *S. cadodendron* Wimm., all of which were ♀. The Continental habitats of *S. dasyclados* were much more numerous and included ♂ and ♀ bushes or small trees. Since no ♂ plants of *S. dasyclados* are known in Britain, the ♀ only must have been planted.

S. aurita × *phylicifolia*.—See *S. atrocinerea* × (*aurita* ? ×) *phylicifolia*.

S. caprea × *lapponum*.—See *S. arenaria* × *caprea* × *repens*.

S. caprea × *repens*.—See *S. arenaria* × *aurita* (× *repens*) ♀.

S. cinerea L.—During his studies of the British Willows in the eighties of last century, Dr F. B. White was highly impressed by the difference between what was known in this country as *S. cinerea* and the Continental plant of the same name as described by the leading salicologists. It was described as ashy-grey, grey-tomentose and hoary-tomentose in equivalent Latin. Not till he had seen a specimen of what he described as "the modification which occurs in Portugal" did he meet with anything like our plant clothed with a thin pubescence, having a mixture of ferruginous hairs. This was described as *S. atrocinerea* Brot. Fl. Lusit., i, 31 (1804). Even then he was unwilling to adopt *S. atrocinerea*, and give it varietal or sub-specific rank. I have seen four leaf-specimens of *S. cinerea* L. selected from the Linnean herbarium by Dr Floderus, and it may be dismissed from our minds as not British.

S. atrocinerea Brot.—This is purely part of an Atlantic flora confined to Portugal, Spain, and the British Islands, being rare and little known in France. It is needless to describe a plant that is well known to every collector in this country, beyond stating that the young, unfolding leaves are more or less thickly clad with red or rust coloured hairs that quickly fall away from the upper surface of the leaves, while those on the under surface thin out, shorten and become red from the end of July onwards till September, and that is the proper period during which it should be collected for study. *S. atrocinerea* has also numerous very short, erect, black hairs, like microglands scattered unequally over the under surface of the leaves. Both the red and black hairs may appear in the hybrids of our species, if not hidden by the dense pubescence of *S. aurita* and the tomentum of *S. caprea*.

S. atrocinerea × (*aurita* ?×) *phylicifolia*.—This is to call attention to specimens distributed by E. S. Marshall under the name of *Salix aurita* × *phylicifolia*, Ref. No. 3158, and collected at Kinnel Burn, near Moffat, Dumfries, on July 19, 1903, and which Dr Floderus named as in the heading of this paragraph, being doubtful if *S. aurita* be in it.

S. atrocinerea × *phylicifolia*.—This is the amended parentage for *S. phylicifolia* × *repens*. I have seen most or all of the specimens distributed under the latter name, including that described by E. F. Linton, ex herb. W. R. Linton, No. 320. I had one from Col. H. H. Johnston, gathered in the Mainland, Orkney, which I regarded as better than that described by E. F. Linton, but Dr Floderus said that *S. phylicifolia* and

S. repens do not intercross, and that my specimens were *S. atrocinerea* ×*phylicifolia*.

S. ferruginea G. And. and *S. cinerea* × *viminalis*, f. *ferruginea* (G. And.).—The amended name of this is *S. atrocinerea* × (*aurita* ×) *viminalis*. I have distributed this on three different occasions under the numbers 441, 495, and 741 from different bushes, all ♀, and Dr Floderus thinks *S. aurita* is one of the parents on account of the small size of the leaves.

S. arenaria L.—Dr Floderus defines this as having silky pubescent ovaries and pedicels, *no style but two short, erect, obtuse stigmas, and densely silky, glossy leaves.* The description of Linnaeus is S. foliis integris ovatis acutis: supra subvillosis, subtus tomentosis. This is faulty and incomplete. The description of Bauhin and Ray is much better but incomplete: *S. pumila*, foliis utrinque candicantibus et lanuginosis. The *S. arenaria* Sm. is *S. lapponum* L. The late S. J. Enander refers three specimens in the herbarium of Linnaeus to *S. lapponum*; and Wimmer is of the same opinion. Dr Floderus admits forms such as *S. argentea* Sm. and *S. incubacea* L. as *S. arenaria* L. if the stigmas were sessile. A. and E. G. Camus admit these two forms as *S. arenaria* L. A sheet of mine named *S. repens* L., f. *incubacea* (L.), sub-form *sericea* Fraser was named *S. arenaria* L. by Dr Floderus, but it being a ♂ I keep an open mind about it. I have recently seen the female of *S. argentea* Sm. from Sussex. Glamorgan, Lancs, two stations in N. Aberdeen, Skye, in the Hebrides, and the Mainland of Orkney, and all of them have got styles and are the hybrid *S. arenaria* × *repens*. Smith did not get all of the specimens in the herbarium of Linnaeus, seeing that many of them were destroyed by herbarium beetles, and *S. arenaria* may have been lost.

S. arenaria×*aurita* (×*repens*) ♀.—This is the parentage of *S. caprea* ×*repens* as gathered by E. S. Marshall and W. A. Shoolbred in E. Perth and S. Aberdeen, including Marshall's No. 2959 from the latter vice-county, and by myself in Surrey.

S. arenaria L. × *caprea* L. × *repens* L. ♀.—The parentage here given is as written by Dr Floderus for the Willow distributed by W. A. Shoolbred through the Watson Exchange Club as *S. caprea* × *lapponum*. It came from E. Perth.

S. arenaria × *herbacea* × *repens* (*S. Grahami* (Borr. MS.) Baker).—This interpretation of the parentage of *S. Grahami* by Dr Floderus is altogether more satisfactory than that admitting *S. myrsinites* as one of the parents, which would have given a stout catkin and a long ovary. *S. arenaria* and some forms of *S. herbacea* could give the hairs on the pedicel, and sometimes on the ovary. All three parents could determine the short, slender catkins. The shape of the leaves, their gloss, crenatures, and the raised venation come from *S. herbacea*; and the rather long style from *S. repens*.

S. repens L.—As defined by Dr Floderus, this has glabrous ovaries and pedicels, a medium to rather a long style, and two stigmas. I have fifty sheets of the *S. repens* group, including all the forms named by Linnaeus, Smith, Wulfen and Andersson, and labelled accordingly. Two which are labelled *S. repens* L., f. *leiocarpa* Andersson have glabrous ovaries, but pubescent pedicels, and small leaves, and would have been pure *S. repens* L., if the pedicels had been glabrous. This state of matters also occurs in *S. repens* L., f. *argentea* (Sm.), *S. repens* L., f. *incubacea* (L.), and *S. repens* L., f. *parvifolia* (Sm.). I retain all these names for the purpose of classification, but have written *S. arenaria* × *repens* on the containing covers. The two species in question must have been crossing and recrossing for thousands of years, and it is a question whether or not they entered this country pure or as hybrids, which are breeding more or less true to the forms which the salicologists have described.

S. phylicifolia × *repens.*—See *S. atrocinerea* × *phylicifolia.*

S. herbacea × *myrsinites* (*S. Grahami*).—See *S. arenaria* × *herbacea* × *repens.*

SOME NATIVE PRIMULA HYBRIDS.

R. MELVILLE.

There is always a great pleasure to be experienced in searching for and finding some species not previously seen in its native habitat. The writer had not seen the true oxlip, *Primula elatior* Jacq., in its native haunts and set forth with the object of finding the plant on the last day of April 1932. After a search in the country to the east of Saffron Walden, a wood near Radwinter yielded its treasure.

The peculiarly limited distribution of *Primula elatior* was worked out by Miller Christy, who gave a detailed account of it in the *Journal of the Linnean Society* in 1897 and later, together with a map, in the *Journal of Ecology*, x, 1922. The plant is confined to the calcareous boulder clay which overlies the chalk on the East Anglian heights, but is limited to two large districts on the southern border of it and to a number of isolated stations to the northward. A few additional stations were reported in the *Journal of Ecology*, xii, 1924. The Radwinter wood lies well within the larger of the two main districts.

Within the limited area of its distribution the oxlip grows in profusion as in the wood mentioned above. At the edge of this wood a single plant with deeper coloured flowers attracted attention. The corolla and calices were found to be intermediate in their characters between those of *Primula elatior* and *P. veris*. There is little doubt that these were the parents, though the hybrid is stated by Miller Christy to be a rare one. In the meadow which borders the wood, cowslips were growing in great numbers.

A number of woods were examined both within and without the oxlip districts. Oxlips were not found beyond their limits nor were primroses found within, so that these observations, so far as they go, confirm those of Miller Christy. Hybridisation between the oxlip and the primrose, is, on account of this distribution, possible only at the the edge of the oxlip districts where the two species meet. It was my good fortune to find a wood near Quendon on the western border of the main oxlip district, where the conditions were right for hybrids to be produced. The wood having been coppiced about four years previously, the 1932 season probably saw the climax of the hybridisation process. Rarely have such masses of blossom delighted my eyes. At a little distance, primroses only were apparent. A closer inspection revealed large numbers of the beautiful hybrid, *Primula elatior* × *vulgaris*, mingled with the primroses, together with a scattering of oxlips and a few plants that agreed with the hybrid *Primula vulgaris* × *veris*.

The hybrid, *Primula vulgaris* × *elatior*, is a handsome plant, intermediate in some respects between its parents, but presenting certain characters of each. The leaf form is intermediate, the lamina being

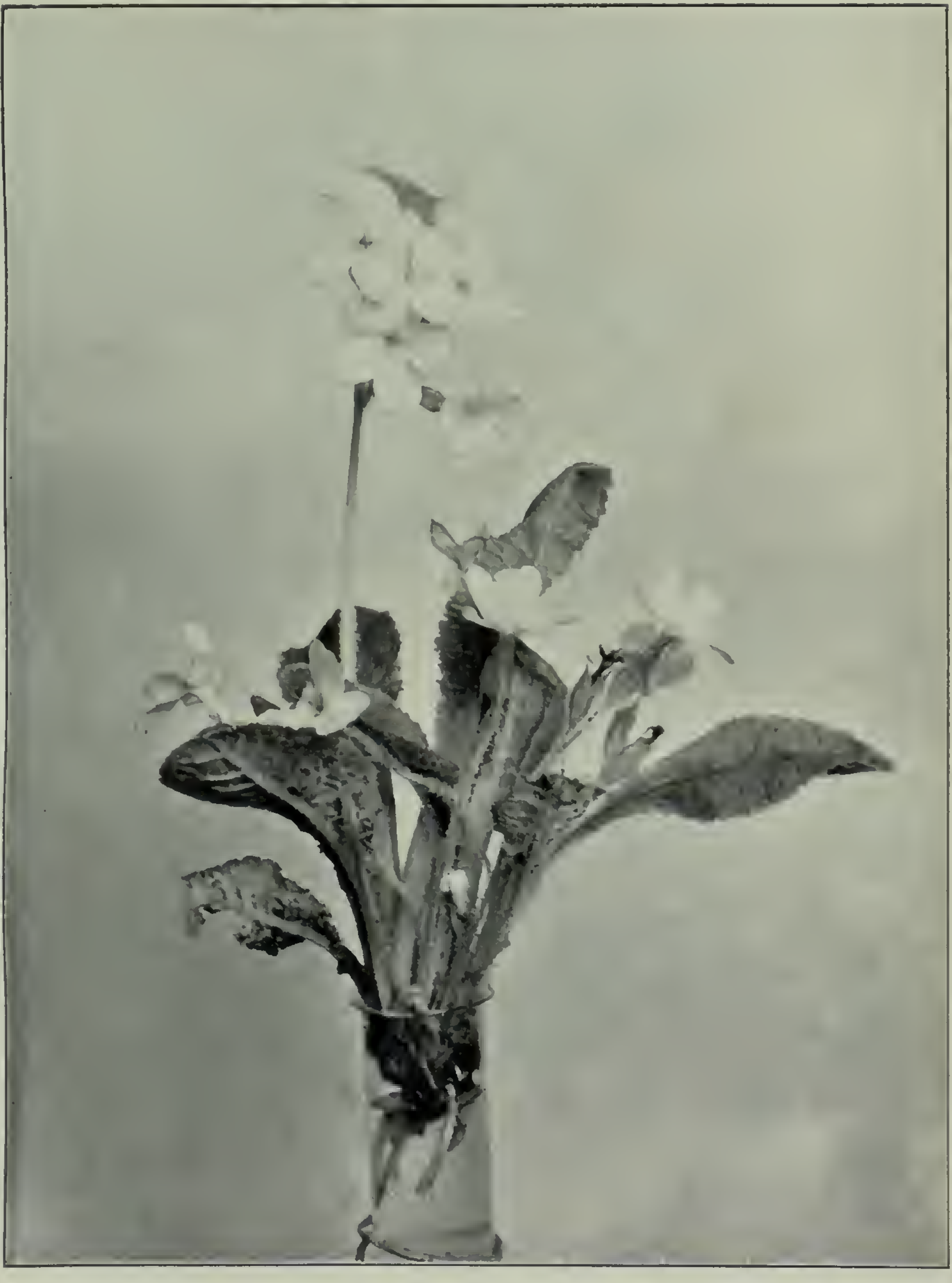

Fig. 1.
PRIMULA ELATIOR × VULGARIS.

[illegible]

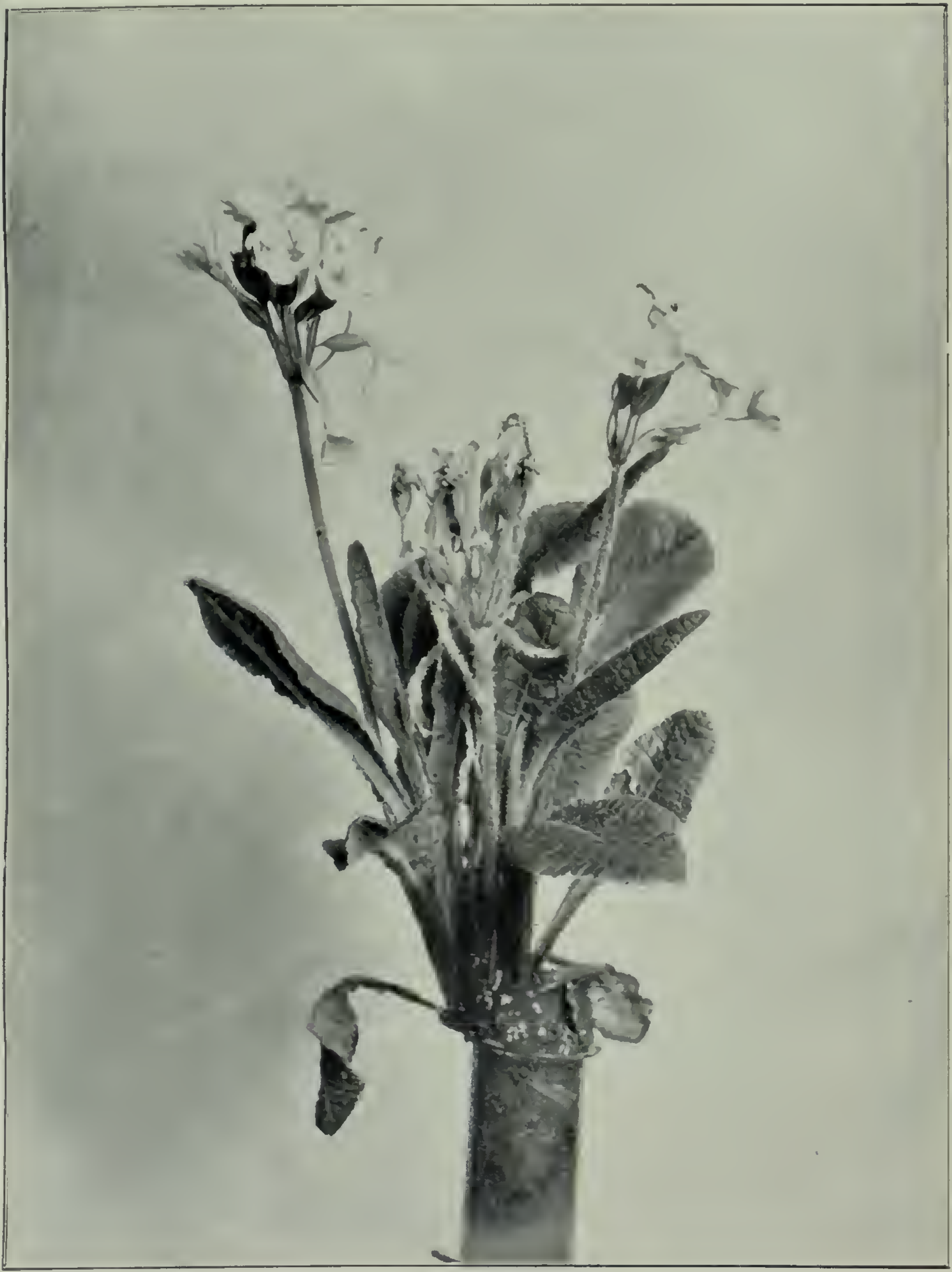

Fig. 2.
PRIMULA ELATIOR × VULGARIS.

[illegible]

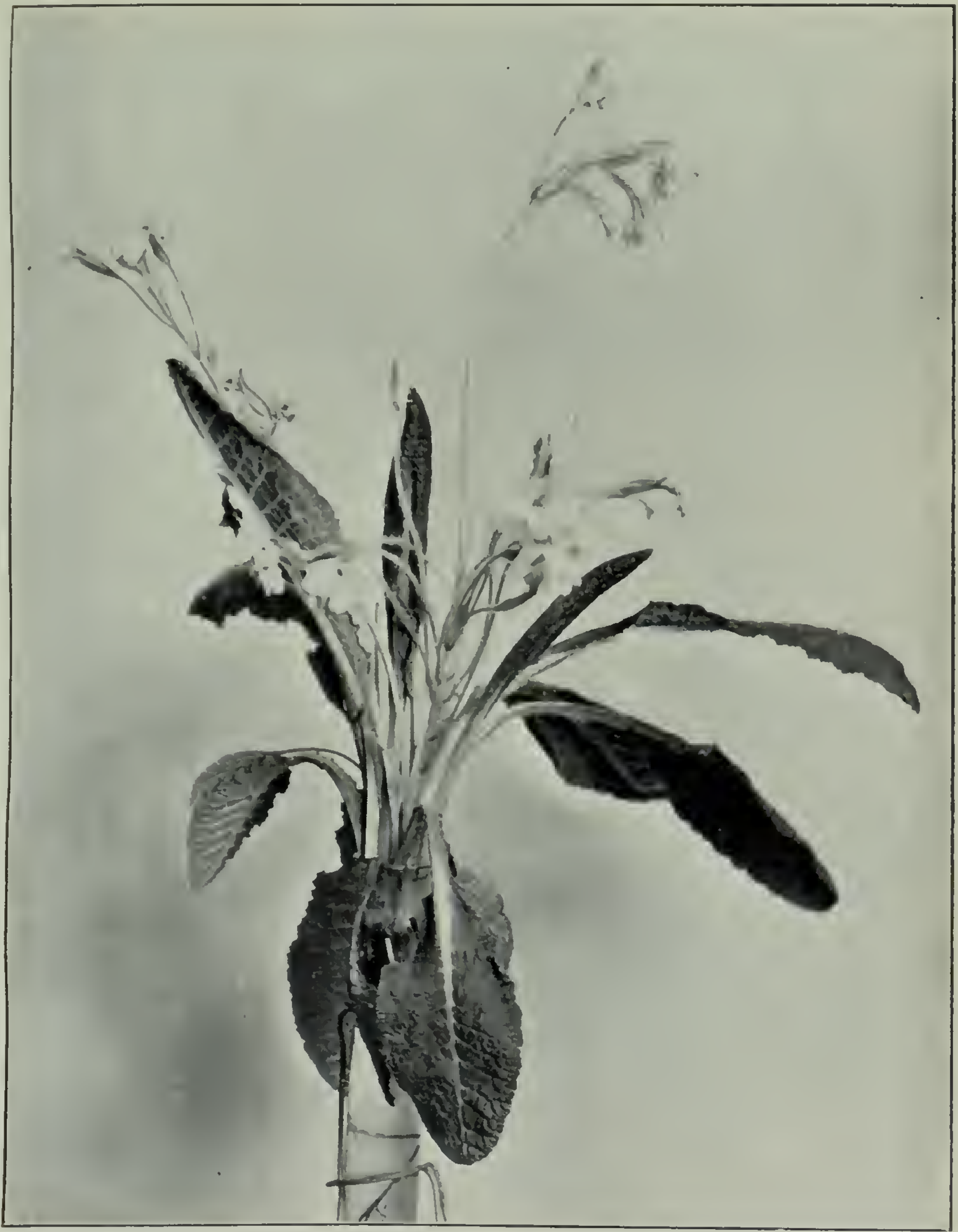

Fig. 3.
PRIMULA ELATIOR × VULGARIS.

[illegible] 30

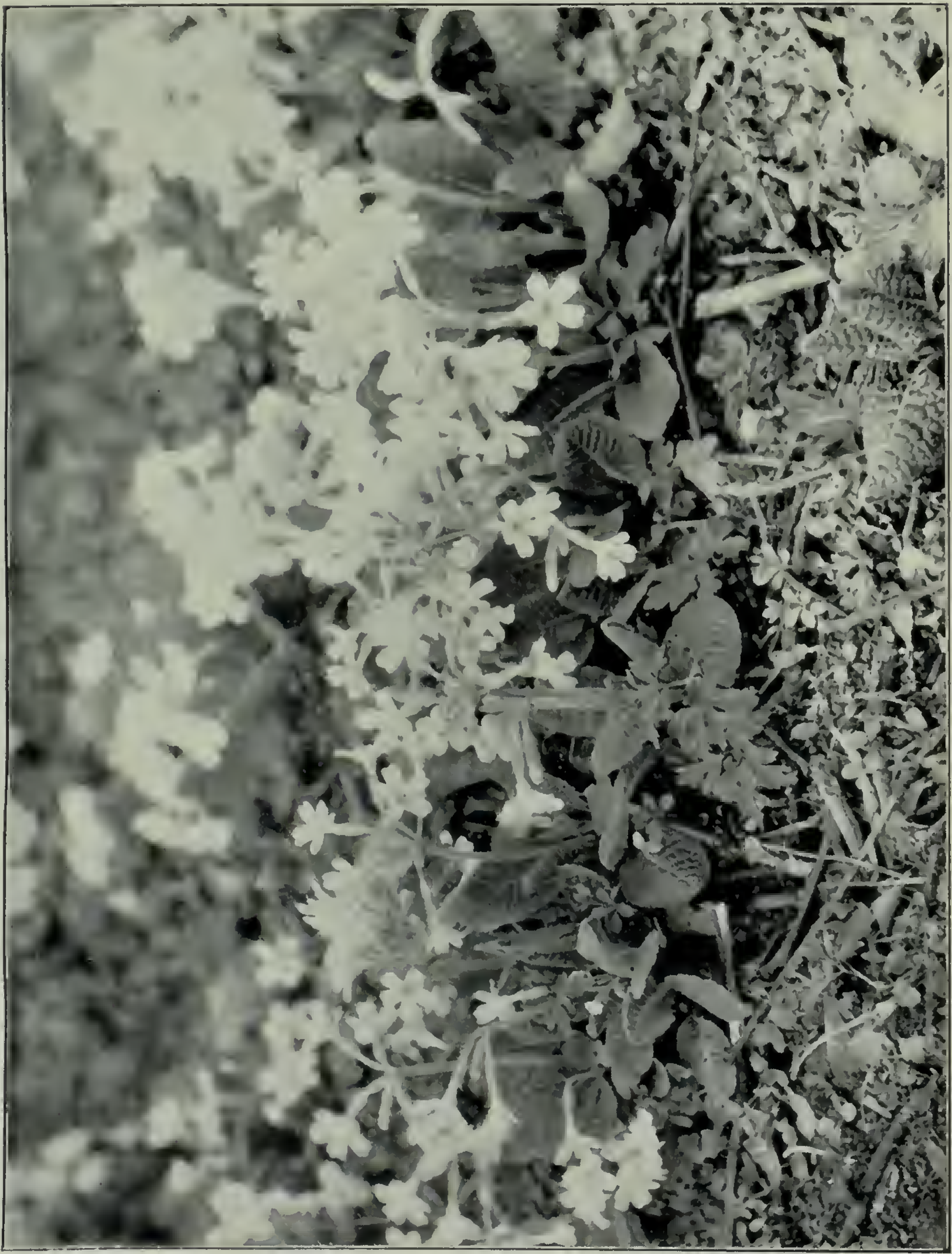

Fig. 4.
GROUP HYBRID WITH THE RED STIGMA.

[illegible]

more decurrent than in *P. elatior*, but less so than in *P. vulgaris*. The flower type and degree of hairiness are both nearer to *P. vulgaris*. The flowers are generally borne on a scape as in *P. elatior*, but the pedicels are relatively long and more or less upright, not nodding. Pedicels, peduncles and calices all possess a shaggy pubescence, which is a distinctive feature of the plant. The corolla is as large as that of the primrose, but the shape is intermediate and the corolla lobes do not overlap. The " eye " of the corolla is of the orange yellow shade found in *P. elatior*.

From the above, it will be seen that the general hairiness and corolla size of *P. vulgaris* are dominant, as are the caulescent habit and corolla " eye " of *P. elatior*. The dominance of the caulescent habit would appear to be incomplete, since the hybrid not infrequently produces acaulescent flowers of the primrose type. Specimens may be found in which both caulescent and acaulescent flowers are present at the same time, as in the example illustrated in fig. I. Varying degrees of irregularity of the scape also occur. A slight irregularity is shown in fig. II, where the central scape has a single pedicel attached to the peduncle at a lower level than the remainder. An extreme case is shown in fig. III. Here, pedicels depart from the peduncle at all levels. According to Miller Christy, *Primula vulgaris*, var. *caulescens* exhibits similar abnormalities, but can be distinguished from the hybrid by its longer pedicels and less shaggy pubescence.

The hybrids described above are all typical of *P. vulgaris* × *elatior*. Other plants showing marked differences from these were found in the same wood. Several small groups of plants of the type illustrated in fig. IV occurred. The corollas of these were of about the same size as those of the primrose but the corolla lobes had almost parallel sides, giving a " square " ended appearance to the petals. The colour was that of the normal hybrid with the exception of a red stigma and touches of red anthocyanin pigmentation at the bases of the pedicels, peduncles and leaf petioles. Both primrose and oxlip normally have green stigmas though the primrose not infrequently has a tinge of red at the bases of the leaf petioles.

The possibility of these plants arising by back crossing of the hybrid *Primula vulgaris* × *elatior* with one of its parents was considered. If this were so, then it is unlikely that the second parent was *P. elatior*, since it has been shown by Chittenden (*Journal of Genetics*, xix, 1928) that this species carries a dominant inhibitor of anthocyanin pigmentation. Wild plants of the oxlip are often heterozygous for this character, however. As no primroses were seen in which red pigmentation extended to the corolla or stigma, it seems unlikely that the second parent was *P. vulgaris*. The plants may have arisen by matings between *P. vulgaris* × *elatior* hybrids in which the dominant colour inhibitor was heterozygous. There is also the possibility that bees may have brought pollen of some pigmented garden form from a distance. This is not at all unlikely. Pollen of the cowslip must, in fact, have been brought from a distance to have given rise to the *P. veris* × *vulgaris* hybrids which were seen in the wood. The cowslip itself could scarcely have had any part in the mating since none of its characters could be distinguished and, as Chittenden says, it probably carries a dominant colour inhibitor.

Two other types of plant were found which may have arisen by the segregation of characters in the F_2 or a subsequent generation. The first, of which not more than two plants were seen, was of the primrose type and differed only in its extremely pale yellow flowers. The second was of the oxlip type with few-flowered umbels and rather small very dark green leaves, which were almost shining owing to the sparseness of their pubescence. The latter character was rather suggestive of *Primula Juliae* Kusnetzow, a common garden species, though nothing else pointed in this direction.

The only satisfactory method of determining the precise nature of these hybrids is to rear the progeny of suitable crosses with them. Some crosses have already been made and the seed sown. It is a matter requiring considerable patience, time, and a large garden. The writer lacks the two latter desiderata and in this matter would welcome the co-operation of another member of the Club.

In conclusion, I should like to express my appreciation of the kindness shown me by Sir Daniel Hall and Mr Philp of the John Innes Horticultural Institution, on the occasion of a visit there concerning these hybrids and also to Dr B. Barnes of Birkbeck College for directing my attention to some of the literature.

A SKETCH OF THE BOTANY OF THE IVEL DISTRICT OF HERTFORDSHIRE.

J. E. Little, M.A.

It will be convenient at the outset to indicate some of the limits to which a short study of the Botany of the district round Hitchin must necessarily conform.

In the first place it will be impossible to provide the reader with lists of even the rarer plants. These may be found by those who desire to consult them in the larger works noticed in the Bibliography to this paper. Nor, save by passing reference, can the very important factors of soil, climate, water-supply, river courses, and elevation above sea-level be here dwelt upon.

It is proper, however, that we should form some opinion upon the question how far we have a natural Flora, and in this connection we may consider plants that have become extinct, and may in some cases be able to suggest a reason.

Again, we may naturally concern ourselves with the field-botanists and other workers who have taken a prominent part in the study of our Flora, and may mark the progress made in an enquiry to which the word *finis* can never be written.

So much of the area of the civil parish of Hitchin being of an urban character, whilst our subject is chiefly concerned with the rural parts, it seems legitimate to take into consideration as much of the surrounding country as may be reached by a fairly active pedestrian using the roads, when he must, and whenever he can the green lanes or the many footpaths which take him across the fields and enable him to escape from present-day motor traffic.

The area of Hertfordshire draining into the basin of the River Ouse—the Ouse Division—was by Webb and Coleman (4) further sub-divided into a Hitchin District, No. 11, and a Royston District, No. 12. These latter so nearly agree with Pryor's Ivel District, No. 2, and his Cam District, No. 1, that we may consider as our especial area Webb and Coleman's No. 11 and Pryor's No. 2 (12) under the name of Ivel. By adopting this natural division we shall have the advantage of being able to compare the recorded flora of 1849, and that of 1887, with the plants found at the present time.

Towards the south and west we have a few larger woods, such as Hitch Wood (178 acres), Wain Wood and West Wood, representing the remains of once more extensive forests; and round the town and in the river-valleys some grass land and a few moorish pieces such as Oughton Head Common and Walsworth Common, but the most conspicuous feature is the arable land upon a variety of soils, light or heavy, covering the chalk or the drift which overlies it. Upon the barer slopes of the chalk to the west and east grow a number of calcicolous plants which form a special feature of our Flora, and often by the brilliance of their flowers and their social habit make great masses of colour visible at some distance.

Of the plants of a true sand-flora we have very few representatives. They must be sought further afield, at Shefford, Sandy or Potton. Speaking generally, our soils are of a mild or non-acid character, and the exceptions to this will chiefly be found in the neighbourhood of the undrained woodlands which cap the hills, or in the limited boggy patches such as those already mentioned.

By no means the least interesting are the weeds of cultivation. Comparing them with those on the Cotswolds, one finds a far greater variety. Some are native, and persist year after year in the same locality; of some the date of introduction is approximately known, while others are casuals, here to-day and gone to-morrow, though a few make for themselves a permanent home and then, except historically, become indistinguishable from the native weeds.

The Prickly Comfrey (*Symphytum peregrinum*) was introduced as a forage plant about the middle of the last century. It is a herbaceous perennial, seeding freely, and has established itself in waste places, not necessarily near water. It is often mistaken for the native Comfrey (*S. officinale*) of lowland streams.

The flora of the wayside is naturally closely connected with that of the adjoining country. Until the end of the nineteenth century the broader strips of waste and the hedgerows harboured a large variety of species. But road-improvement and close-trimming by the county and urban authorities have converted into bare, almost treeless, stretches many tens of miles once bordered in summer by the rich gold of Lady's Bedstraw, the mauve of the Scabious, and the purple of the Knapweeds, carpeted with wild Thyme, and overhung by the Wayfaring Tree, Dogwood (E. J. S.), the Spindlewood, and the Wild Rose. In the aggregate, the loss of the wayside flowers from this cause is probably the most important change that has to be recorded.

Our walls being chiefly built of brick, and our rainfall relatively low, the flora of the walls in limited to more hardy plants such as "Golden Moss," really a Stonecrop (*Sedum acre*). On the old walls about Wratten still grow Whitlow Grass (*Draba verna*) and Rue-leaved Saxifrage (*Saxifraga tridactylites*). They were gathered near by about ninety years ago, and are still preserved at The Priory in the Radcliffe Herbarium (2). A few damper walls allow the growth of Liverworts, and the pits of the old water mills are a refuge for some of the commoner species of Fern. Some have even been found growing on the sides of the pits of the storm-water drains.

The Flowerless Plants or Cryptogams have in some of their sub-divisions received the attention of local specialists. William Hill (1849-1914) and Francis Ransom devoted much time to the Diatomaceae. Of those listed for the county about sixty have been recorded for the Ivel District. Perhaps the most interesting are *Campylodiscus costatus* and *C. spiralis* (8, 10, 11, 16). The Freshwater Algae, however, as a whole, still lack a local recorder.

William Dawson studied Lichens, but his collection of this group (now at the South Kensington Natural History Museum) was made in the Hertford District.

Information as to Mosses is very inadequate. Those that are known only number fifty-eight (2, 55), and the number of Fungi is about the same. A very large field, therefore, in these two groups still requires investigation.

The district being of a dry upland character has but few representatives of the Characeae; some have been determined by Jas. Groves and Thomas B. Blow.

Several species of Fern, once more widely distributed, have become rare or extinct, owing partly to the improved drainage of the land, partly to the disappearance of woodland in which they grew, and partly to the professional fern-hunter. The disappearance of the Black Spleenwort (*Asplenium Adiantum-nigrum*) is in one case known to be attributable to the latter cause.

When we turn to Flowering Plants we find that the wider appeal generally made by them is exemplified in our own district, and since the second quarter of the nineteenth century there has not been wanting a succession of flower-lovers to hand on the torch.

One of the earliest of whom I have any information was Isaac Brown (1803-1895). He had a school at The Triangle (Bull Corner), and himself recorded copiously for the *Flora Hertfordiensis* of Webb and Coleman. Under his direction his pupils collected plants, and one such Herbarium has been preserved (3). Some of these specimens are valuable as evidence that plants now extinct were then growing in the district, such as *Ranunculus parviflorus*, *Parnassia palustris*, and *Erica Tetralix*.

Joseph Pollard (1825-1909), of High Down, was from boyhood upwards, and on to the end of his honoured life, an enthusiastic lover of wild flowers. His Herbarium (5) shows that among his botanical correspondents and friends were Bishop Mitchinson, Master of Pembroke College, Oxford; James Saunders, author of *Field Flowers of Bedfordshire*; Charles Crouch, of Kitchen End and Ampthill; and William Marshall, of Ely (1816-1890), who contributed much to the knowledge of the flora of the Fens. Pollard's Herbarium contains a large number of local specimens, and his records were mostly incorporated in the second flora of the county (12).

Alfred Reginald Pryor (1839-1881), born at Hatfield, was educated at Tonbridge School (1852-7), of which he was at length head boy, and he went up to Oxford with a Judde Exhibition from the school, becoming also a scholar of University College. So far as his health allowed, he was at work upon his projected Flora from 1875 until his death at Baldock. The manuscript which he left was entrusted first to James Britten, and then to John Hopkinson, but neither was able to carry it through the Press, and it was only through the assiduous work of Benjamin Daydon Jackson (then Secretary to the Linnean Society) that, under the auspices of the Hertfordshire Natural History Society, it at length reached publication.

Jackson's work upon it was in reality much more important than his own modest estimate in the Preface (p. vi) claims. There were in the manuscript generally no localities, but these were supplied partly from Webb and Coleman's Flora, and partly from more recent observers (*e.g.*, Joseph Pollard).

William Dawson (1805-1889), who "taught three generations and was beloved by all," left no Herbarium (except the Lichens already mentioned), but he recorded for Webb and Coleman, *e.g.*, *Geranium pyrenaicum* at Preston, in which district it may still be found. He was a sturdy walker, and it was his delight to take his pupils to see such plants as the Columbine (*Aquilegia vulgaris*), now apparently extinct as a local wild flower. Theodore Lucas (1838-1927), one of his pupils, was accustomed, so long as he was able, to revisit the places where under Dawson's guidance he had found specially prized plants. In Dawson's memory was established the Dawson Memorial Fund, which offers to children of school age yearly prizes for the study of Natural History. His son, Arthur William Dawson (1850-1928), for many years acted as examiner for these prizes.

John Ransom of Grove Mill (1787-1867) and Alfred Ransom of Benslow (1821-1911) assisted in recording our flowering plants. The latter, like his brother William (1826-1914), had a garden filled with interesting trees, shrubs and herbaceous plants (37).

James Rodway (18..-1926), a native of Trowbridge, in Wiltshire, was a chemist at Hitchin in the early seventies, and an ardent field botanist. Rising at daybreak, he was wont to scour the neighbourhood in search of plants. Rodway left Hitchin to take a post in British Guiana, where he spent the rest of his life, becoming the Official Historian of the Colony, and an authority on its Natural History. He was elected F.L.S. in 1886.

Robert Bentley (1821-1893), Professor of Botany at King's College, London, came of a local family, and in 1857 contributed local records to *The Phytologist* (6). One of his finds near West Mill, the Unbranched Bur-reed (*Sparganium simplex*), was questioned as an error in Pryor's Flora, but was rediscovered by the present writer in 1921, thus vindicating his accuracy.

Of the same species Isaac Brown recorded "A single specimen in a ditch at Cadwell." This also was doubted in Pryor's Flora, but it is quite likely to be correct. The plant occurs lower down in Bedfordshire at Campton, and on Biggleswade Common.

Such rediscovery gives hope that some Sedges, formerly recorded for Oughton Head by Thomas B. Blow, may yet be found again. They are *Carex dioica*, *C. pulicaris*, *C. teretiuscula*, *C. stellulata*, *C. acuta*, *C. binervis*, *C. xanthocarpa* (now reckoned a hybrid) and *C. vesicaria*. Blow in his "Outlines" (see below) remarked:—"I know of no more interesting place for the study of the Sedges than Oughton Head. It can safely be said that for its size it has not its equal in England." This, however, it should be noticed, was in 1880, and conditions are now altered. One Sedge, *C. stricta* Good., recorded by Joseph Woods in 1843 for Oughton Head, for many years the only known station in the county, was rediscovered there in 1921 by the present writer. In the same way, the Parsley Water Dropwort (*Oenanthe Lachenalii*) was rediscovered upon Norton Common in 1915 by Richard Morse.

One of the original members of the Hitchin Natural History Club, which was formed in 1879, was Thomas Bates Blow (b. 1853). He published in the *Hertfordshire Express* of 1880 a series of articles entitled "Outlines of a Flora of the Neighbourhood of Hitchin," and his records were incorporated in Pryor's Flora. Blow was greatly indebted to Rodway for the beginning of his field-work, and kept up close acquaintance with Rodway until the death of the latter. From 1894 onwards this field-work was ardently pursued in nearly every country of the world, and in collaboration with James and Henry Groves was more especially devoted to the Charophyta. Accounts by James Groves of species due to Blow's discoveries in Madagascar in 1924 appeared in the Linnean Society's Journal, December 1928, one new species being named in his honour, *Nitella Blowiana* (48).

The Hitchin Natural History Club used to meet once a month, and one of the items of the Spring meetings was the presentation of Phenological Reports, *i.e.*, records of the first flowering of certain selected plants which eventually found their way to the Meteorological Society. There was great though entirely friendly rivalry over the earliest finding in flower of some other plants. One such, the Butterbur (*Petasites ovatus*), may be mentioned. Although not truly dioecious, there are two types of plant, the one sub-male and the other female. As seen on the River Yore in Yorkshire the fruiting stems are extremely handsome, but they have never been observed in the Ivel district, where we appear to have only the sub-male plant, which therefore propagates entirely by vegetative sub-division, and occurs in various places along or near the banks of the river Hiz. The normal flowering time is in April or May. Two ladies, however, were generally a long way ahead of other recorders at the Club meetings, and the explanation which long afterwards suggested itself may be correct, namely, that instead of the native species they produced the Winter Heliotrope (*Petasites fragrans*), an established alien which flowers from December to March. It was flowering in December 1928 on the banks of the Hiz, about a quarter of a mile from a station for *P. ovatus*.

In the winter a Soiree was usually held, for which all available microscopes were borrowed and staged with exhibits. ["On one occasion fifty microscopes were in use." (T.B.B.)] This was at the Soiree of 1890, given by the president, Francis Ransom, the most memorable of the series. The front page of the programme was specially designed by Frederick William Phillips (1854-1910) to illustrate such objects as were being displayed. He also drew a most elaborately symbolical cover for a Journal which was issued monthly for the year 1891, but was then discontinued.

Francis Shillitoe (1848-1924), many years Secretary to the Club, found in his garden at Payne's Park in 1891 a rare fungus, *Clavaria Ardenia*, and a drawing of this made by Miss Seebohm was exhibited, along with other water-colour paintings of Fungi, at the Soiree of that year. Mrs Samuel Lucas, of Tile House, on various occasions at these Soirees exhibited paintings of Wild Flowers.

The Letchworth and District Naturalists' Society was founded in 1908 and, through a bequest and donations, was enabled to build in 1914 a Museum which was afterwards enlarged. The Library includes a number of Botanical works, and the Herbarium contains many local specimens, arranged by the care of W. Percival Westell, T. A. Dymes, and other workers. A number of excellent photographs of trees, taken by Henry Irving, are displayed on the walls. These are shown in full leaf for the summer aspect, under bare poles for the characteristic branching of the twigs, and as boles for the habit and splitting of the bark.

In papers dealing more at length with the subject (44) it has been shown by the present writer that our landscape has been profoundly modified by human activity. The ancient forest which once hemmed in our district on the South is now represented only by woods into which periodical felling and coppicing have introduced new conditions. The open downland has been broken up for agriculture and so restricted that it needs some imagination to picture what must once have been its aspect. The cultivation terraces on the slopes of the hills remind us of a tillage so ancient that some of it possibly dates back to prehistoric time, yet leaving its impress upon the fields of the present day.

Close to the town of Hitchin, upon the north side of Windmill Hill, there now stands a piece of woodland, part of which is known as The Sanddell Wood. If we refer to a map dated July 1, 1822, in Clutterbuck's *Hist. of Herts*, we find The Sanddell marked as already occupied by wood which probably grew up after the disuse of the sandpit, while tho slopes to the east of it, now also covered with woodland, are marked as five cultivated strips, separated by the four balks or linces which can still be traced. The woodland, therefore, now covering these cultivation terraces is little more than a century old, and oral tradition has also preserved the memory of these strips as having once been in cultivation.

Other small woods, as at Mount Pleasant and at Oughton Head, are of known date (36). The trees round the arable fields cannot have existed until after the enclosure of the open common fields. Thus the elms, the ashes, the hornbeams and the oaks of the hedgerows can only in a very limited sense to put down as natural. There is reason to think that the beeches of the Ivel district are largely planted, although some as in Hitch Wood may be native. With the exception of the Aspen, all the Poplars in the district have been planted (29). The Willows, although some are of natural origin, very generally owe their existence to the same cause. We have nine species, and a large number of hybrids (31).

To distinguish a plantation from a piece of natural woodland is not always easy. In the Ivel district the Scotch Fir is not native, and the

Spruce or the Larch is a certain indication of planting. ["Such exotics have often been planted, however, in otherwise natural woods" (E. J. Salisbury)]. But besides the evidence of the trees themselves we find differences in the shrub layer and the ground plants which will assist in a decision. Plantations more than a hundred years old are still slow to take on the aspect of true woodland, and the diversity which characterises the latter is replaced by greater uniformity. Yet the process of assimilation does go on, some plants being more ready colonisers than others. Among our shrubs the Spurge Laurel (*Daphne Laureola*), and of herbaceous plants the Wood Sanicle (*Sanicula europaea*), are pioneers. The White Helleborine (*Cephalanthera grandiflora*) occurs in a plantation on old cultivation terraces near Royston and in a plantation near High Down. It was found in grass in Miss Christiana Foster's garden, on the site now occupied by Hitchin Town Hall. The Bird's Nest (*Monotropa Hypopitys*), although it often escapes notice, behaves in a similar manner. The Tway-blade (*Listera ovata*), apparently originating in wind-blown seed, has been found in a garden, to which it was certainly not introduced by design. It also occurs abundantly in plantations a century old.

It has often been remarked that our countryside must be looked upon as a garden of a larger kind. We know nothing of wild nature as represented by square miles of moorland, fen, or forest.

Yet *Naturam expellas furca, tamen usque recurret*, says Horace, and through all this land over which man has cast his spell we see a constant struggle to go back to the conditions which prevailed before he took a hand. Thorntrees and briars establish themselves on derelict land as the forerunners of re-afforestation. In the cornfields may often be found seedling oak and ash, blown thither by the wind from the hedgerows.

The very weeds do but flourish the more on land that is broken up, so that for the botanist the continual ploughing has its compensations. There are plants which he knows he will find on arable, though if it were laid down to grass they would in a few years occupy a more restricted area. Such are our Eastern Counties Pignut (*Carum Bulbocastanum*) and the Thorough Wax or Hare's Ear (*Bupleurum rotundifolium*).

The apparent balance of wild vegetation which prevails under one method of cultivation may be disturbed when new methods are introduced. Consolidation of ownership has resulted in the merging of acre strips formerly separated by balks (44). These balks have been the stronghold of certain plants, among them the Greater Knapweed (*Centaurea Scabiosa*), brother to the Blue Corn-Flower (*C. Cyanus*), which latter is sometimes sufficiently abundant to tinge a cornfield. Upon the former as a host-plant grows the Tall Broomrape (*Orobanche elatior* Sutton), a curious foxy-coloured parasite, needing no green leaves because the necessary food is elaborated for it in the green leaves of the host plant. It has not of late been common in the Hitchin district, but Mrs W. E. Hitchcock-Spencer sent locally-gathered specimens in 1912, and formerly it was probably not infrequent near Hitchin, as it has been till recently well distributed in the Baldock-Bassingbourn region in similar situations.

A few instances may now be given of plants inhabiting damp ground or bog which have become extinct. The Butterwort (*Pinguicula vulgaris*) is no more to be found on Norton Common (3), nor the Bog-Pimpernel (*Anagallis tenella*) nor Knotted Spurrey (*Sagina nodosa*) on Oughton Head (5). Doubtless, for these, changed soil conditions, due either to the more rapid sub-soil drainage, or to the slower but relentless effect of the lowering of the water table, must be held responsible.* But the burning of the grass with the notion that it would improve the herbage has in the case of Oughton Head also resulted in the destruction of a number of small plants, whilst the herbage, instead of becoming finer, is now almost entirely composed of coarser growths. Yet, even so, one may still record with pleasure the appearance in 1928 at Oughton Head, upon acid peat, of an unrecorded native Moor Grass (*Molinia caerulea*) never detected by the older botanists and unnoticed during the last forty years. The nearest station known was at Bulls Green, Datchworth, where it now seems to have died out. A possible explanation of its occurrence is that the seed was conveyed by some moor-haunting bird, and so established itself in this new station.

As an instance of an area within the parish of Hitchin now engulphed by the tide of bricks and mortar, one may give the old cricket field, endeared by old associations to many a stalwart wielder of the willow, and to those who watched them from beneath the shade of its pleasant avenue of limes. Here, within a limited area of about seven acres, were growing in 1911 some 75 different species of trees, bushes, herbs, and grasses. A few deserve special mention, as the Mountain Crane's-bill (*Geranium pyrenaicum*), Least Yellow Clover (*Trifolium filiforme*), the Fiddle Dock (*Rumex pulcher*), and the Horse-mushroom (*Psalliota arvensis*). The thought of cricket reminds us that good cricket-bat Willows (*Salix alba*, var. *caerulea*) have been grown in our district.

A rather special industry pursued at our chalk springs, *viz.*, the growing of water-cress, claims notice. The plant grown is precisely the wild plant and not, as in the case of the Cabbage, a plant so improved by selection that it appears utterly different to the wild Sea-Cabbage of the cliffs upon the coast. The art of growing water-cress lies in the grading of the beds below the springs so as to secure a gentle even flow; in the planting, often with stones used as anchors, so that the heads just come to the surface of the water; and in keeping the beds free from such weeds as Water Parsnip (*Apium nodiflorum*) and Duckweed and from autumn leaves. A little artificial fertiliser is sometimes thrown over the plants.

Another special cultivation in the district is the growing of Lavender and of certain herbs for drugs (7 and 17), as Peppermint (*Mentha*

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*The great drought of 1921 had far reaching effects upon the flora of the damp woodlands. Where Herb Paris (*Paris quadrifolia*) was present in fair abundance in 1912, only a single specimen could be seen in 1928.

piperita), Squirting Cucumber (*Ecballium elaterium*), Henbane (*Hyoscyamus niger*), Lettuce (*Lactuca virosa*), and Deadly Nightshade (*Atropa Belladonna*). These five last sometimes escape and appear as casuals, and the last two have become thoroughly established.

There does not appear to be any local instance of poisoning through eating the berries of the Deadly Nightshade. Children in the schools are now generally taught to recognise and avoid it. But even the Common or Woody Nightshade (*Solanum Dulcamara*) has dangerous properties. In 1907, at Offley Holes, Sir Joseph Priestley had a calf poisoned through eating it, and later at Cadwell the death of a cow was attributed to this cause. Charles W. E. Ansell of St Ippolyts found the plant dangerous to cattle in the earlier season of the year, and drovers have asked George Tagg, stationmaster at Hitchin, to remove it from the approach to the cattle pens.

In May 1926, William W. Goldsmith had a case of cattle affected by eating hay containing a proportion of Horsetail (*Equisetum arvense*) from a meadow at Whitwell. As to the Horsetail family, Coste (*Flore de France*) remarks:—"Ce sont des plantes très fibreuses, dures, indigestes, peu nutritives, impropres à la nourriture des animaux, et même malfaisantes."

The disturbance and partial displacement of the Natural Flora by weeds of foreign origin, largely annuals, has during the present century proceeded at an increasingly rapid rate. Of aliens recently recorded, some due to granary sweepings, some to peat-moss litter, some to chicken-food, some borne "carriage free" in railway trucks, others distributed along the roadside, and lastly, in one very remarkable recent case, from the use of shoddy waste as manure, an increasingly long list is rapidly accumulating. Not less noteworthy is the surprising variety of their origin. There are representatives from S. Europe or N. Africa (*Medicago laciniata*, *Carthamus tinctorius*); from Asia (*Brassica juncea*); from N. America (*Chenopodium leptophyllum*); from S. America (*Tagetes minuta*), and from W. Australia (*Erodium cygnorum*), besides those of countries lying nearer to us (53).

Although we cannot claim the discovery in our district of any native species new to Britain, some progress has been made in the study of segregates (43). By this is meant that plants which were formerly grouped together under a general description are found to be separable by certain characters of greater or lesser importance under divisions which in some cases are regarded as good species, in others as sub-species or micro-species, in others merely as varieties or forms. A single instance must suffice. To the old botanists there was but one Eyebright (the aggregate *Euphrasia officinalis*). Several of its segregates (*E. nemorosa*, *E. pseudo-Kerneri* Pugsley, *E. borealis*) have now been found and identified for our district. In this way there have been added for the Ivel District, since the publication of Pryor's Flora, 106 sub-species, micro-species, varieties and forms, together with 25 hybrids.

The minor variations having been thus accounted for, we have to add to our list 91 newly-recorded aliens, as well as 21 species native in some other part of Britain, which nevertheless there is reason to regard as introduced into the Ivel District.

Upon the standard adopted in Pryor's Flora the following 27 native Phanerogams and Vascular Cryptogams have been added since 1887 for the Ivel District:—

Cardamine flexuosa With.
Sagina filicaulis Jord.
Potentilla procumbens Sibth.
Pyrus torminalis Ehrh.
Crataegus monogyna Jacq.
Epilobium tetragonum Curt.
E. obscurum Schreb.
Matricaria Chamomilla L.
Arctium majus Bernh. (restricted).
Cirsium anglicum Lam.
Verbascum Lychnitis L.
Veronica agrestis L.
Atriplex erecta Huds.
Salix triandra L.
Salix purpurea L.
S. aurita L.
Betula pubescens Ehrh.
Aceras anthropophora Br.
Hydrocharis Morsus-ranae L.
Zannichellia palustris L.
Isolepis setacea R. Br.
Carex Pseudo-cyperus L.
Apera Spica-venti Beauv.
Molinia caerulea Moench.
Nardus stricta L.
Equisetum maximum Lam.
Lastrea spinulosa Presl.

It is more difficult to give a fair estimate of plants which either have definitely become extinct or may be regarded as vanishing. Approximately their number may be put down at less than twenty-five. Whether the losses can be held to be balanced by the gains depends very much upon the personal equation. With some reserve, the opinion is given that present conditions, changed though they are, still offer the student a practically unlimited field for investigation, not only as already indicated among the Cryptogams, but even among the supposedly better known Phanerogams, concerning whose life-history so much still remains to be learnt.

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NOTES ON THE GENUS MYOSOTIS.

I.—REVISED DESCRIPTIONS OF THE BRITISH MARSH AND WATERSIDE SPECIES.

A. E. Wade, F.L.S.

Much confusion still exists in the naming of the British species of *Myosotis*, more especially of those which grow by our streams and in our marshes. This is due in a great measure to the rather short and often inadequate descriptions in our British Floras. Greater still is the confusion in regard to the varieties and forms, and here not only is inadequacy of description responsible but also frequent misapplication of names.

These revised and amplified descriptions are put forward in the hope that they will prove of some assistance in the identification of our British plants. The varieties and forms known to occur in Britain are included.

Myosotis palustris Hill Herb. Brit., p. 170, 1769. **M. scorpioides**, var. **palustris** L. Spec. Pl., ed. 1, p. 131, 1753.

Perennial. Rhizome long and stoloniferous, or short and non-stoloniferous. Stem usually branched, decumbent, rampant or erect, angular, with patent or adpressed hairs, sometimes almost glabrous. Leaves usually with adpressed hairs, sometimes subglabrous; lower leaves oblong-lanceolate to obovate-lanceolate, obtuse, attenuated into the petiole; the upper leaves narrower, obtuse or subacute and usually apiculate, sessile. Cymes leafless. Calyx campanulate, with adpressed hairs; segments triangular and about ½-⅓ of the calyx. Fruiting pedicels one to two times as long as the calyx, rarely longer, patent or reflexed. Corolla usually 4-10 mm. diam., rarely only 3 mm. diam., sky-blue, rarely white; limb flat; lobes emarginate. Style equalling the calyx tube or longer than the calyx. Nutlets narrowly ovoid, black, shining, rounded at the apex, slightly bordered, not keeled; average size 1.5 mm. × 1 mm.

Habitat—Sides of streams, rivers and pools.

Var. **Memor** Kittel Tasch. Fl. Deutschl., ed. 2, p. 421, 1884.

Rhizome long, stoloniferous. Stem robust, decumbent, elongated, hairs patent or erect-patent below, adpressed above, sometimes the plant is almost glabrous. Leaves with adpressed hairs; lower leaves broadly-lanceolate; upper leaves slightly narrower, obtuse or subacute, apiculate. Cymes short. Lower fruiting pedicels about twice as long as the calyx. Corolla large, 3-8 mm. diam. This is the common form in Britain and is characterised by its very robust habit and stoloniferous rhizome and by the stem usually emitting numerous barren shoots.

Forma ALBIFLORA Desportes (pro var.) Fl. de la Sarthe, p. 169, 1838.

Flowers white.

Forma MACRANTHA Beck von Mann. Fl. Nied.-Oest., p. 969, 1893.

A form with flowers from 5-10 mm. diam.

Forma PARVIFLORA Ledeb. (pro var.) Fl. Alt., i, p. 189, 1829.

A form with the flowers about 3 mm. diam. and the flowers rather closer in the cyme.

Forma SUBMERSA Glück in Biol. und Morph. Untersuch. über Wasser und Sumpfgewächse. III. die Uferflora, p. 294, 1911.

Plant submersed, up to 44 cm. long, glabrous or with rudimentary hairs. Stem simple or branched. Leaves 2.5-8.2 cm. long by 4.5-14 mm. broad. Not flowering.

Var. HIRSUTA Braun in Asch. Fl. Brandenb., p. 448, 1864.

Rhizome stoloniferous. Stems 7-20 cm. high, erect or decumbent, very hairy below with patent hairs, hairs adpressed above. Barren shoots with patent or erect-patent hairs. Upper leaves ovate-lanceolate, obtuse, apiculate; lower leaves obovate-lanceolate, obtuse. Cymes rather short. Fruiting pedicels as long as the calyx, patent, the lower becoming recurved. Calyx as in the type. Style longer than the calyx. Corolla 8 mm. diam.

Var. SEROTINA Hülphers (pro sp.) in Svensk Bot. Tidskr., 21, p. 69, 1927.

Stem 30-75 cm. high, more or less patently hairy below, emitting numerous sterile shoots. Leaves numerous, dark green; upper, lanceolate; lower leaves, lingulate and shortly petioled. Fruiting pedicels 1½ times as long as the calyx, patent or a little reflexed. Calyx short, rotundate-campanulate; calyx segments broad, short, about ¼ of the calyx. Styles a little longer than the calyx. Corolla about 10 mm. diam. Nutlets broadly ovate.

Var. LAXIFLORA (Reichb.) Mert. u. Koch Deutschl. Fl., ii, p. 40, 1826.
M. LAXIFLORA Reichb. in Sturm Deutschl. Fl., Heft 42, 1822.

Rhizome horizontal and stoloniferous. Stem erect, tall and slender, up to 2 feet high, simple, decumbent when growing in water, hairs adpressed, those of the barren shoots spreading. Leaves lanceolate, usually narrow, seldom broad; lower leaves obtuse, the upper acute. Cymes lax, single or bifid, 20- or more-flowered. Fruiting pedicels 3-4 times as long as the calyx, patent or reflexed. Calyx short, almost hemispherical. Corolla large, 8-10 mm. diam.; lobes emarginate. Style slightly longer than the calyx. This is a form of wet shady places, characterised by its tall slender habit, long pedicels, and its style exceeding the calyx.

Var. STRIGULOSA (Reichb.) Mert. u. Koch Deutschl. Fl., ii, p. 40, 1826.

Rhizome horizontal, non stoloniferous. Stem erect or decumbent, 30 cm. or more high, with adpressed hairs throughout, seldom with barren shoots. Leaves oblong-lanceolate, strigose; lower leaves lanceolate, obtuse. Cymes fairly long, 20- to 40-flowered. Fruiting pedicels 1-2 times as long as the calyx, patent or slightly reflexed. Calyx as in typical *M. palustris*. Corolla large; lobes emarginate. Style as long as the calyx tube.

Forma NEMOROSA Bess. (pro sp.) Enum. pl. Volhyn., p. 52, 1822.

Stem glabrous with a few adpressed hairs above.

Var. REICHENBACHIANA (Dum.) Wade in Rep. B.E.C., 1929 (1930), 163.
M. CORONARIA, var. REICHENBACHIANA Dum. Bouq. litt. belge, p. 37, 1868.

This variety differs from *strigulosa* in having the stem clothed with patent hairs.

MYOSOTIS REPENS (Don) Reichenbach ex Sturm, Deutschlands Flora, Heft 42, 1822.

Perennating by means of stolons. Rhizome short, scarcely creeping. Stem erect, 20-60 cm. high, hairy below with patent hairs; with decumbent or prostrate, barren or flowering shoots at the base, the barren shoots rooting at the nodes. Lower leaves ovate-spathulate, attenuated into a short petiole, obtuse, sparsely hairy on both surfaces, ciliate below. Upper leaves sessile, oblong-lanceolate, obtuse or subacute, hairy on both surfaces, ciliate at the base. Inflorescence lax, bracteate below. Fruiting pedicels reflexed, 3-5 times as long as calyx. Calyx with adpressed hairs; segments exceeding the corolla tube; fruiting calyx campanulate; segments lanceolate, acute, about ½ the length of the calyx. Corolla sky blue, 4-6 mm. in diameter, plane; lobes slightly emarginate. Style short, about as long as or slightly longer than the calyx tube. Nutlets dark brown, shining, broadly ovoid, somewhat truncate at the base, slightly bordered, not keeled, rounded at the apex, average size 1 × 0.75 mm.

Habitat—Boggy places, swamps and muddy ditches.

In Hooker's *Flora Scotica* (1821) this is referred to as " *M. palustris*, var. β " but no description is given. F. N. Williams in his *Prodromus Florae Britannicae* states that the German plant is only a trifling variation of *M. palustris* and by no means identical with the British plant; however, there is a Scottish specimen in Reichenbach's herbarium at Vienna, and it is probable that he knew our plant quite well. On the whole his description in Sturm, *Deutschlands Flora*, agrees with our plant, although he states that the style is long and in the figure shows it as exceeding the calyx teeth. I have not seen any specimens of *M. repens* from Germany but specimens from other parts of Europe are practically identical with our plant.

Myosotis brevifolia C. E. Salmon in Journ. Bot., lxiv, p. 294, 1926.

Perennial. 12-23 cm., occasionally reaching 30 cm., dark bluish green. Stem producing stolons near the base from the leaf axils and bearing small leaves and rootlets; hairs adpressed or slightly spreading-ascending towards the base. Leaves short, broad and rounded obtuse or emarginate at the apex, scarcely more than twice as long as broad, only the lowest tapering towards the base, hairs adpressed. Branches of the inflorescence from below the centre of the stem, erect-patent; inflorescence rarely bracteate below. Fruiting pedicels patent or recurved, as long as or twice as long as the calyx. Calyx narrowly campanulate, with adpressed hairs; segments oblong, a little more than ½ of the calyx, rounded or obtuse at the apex. Corolla pale blue, about 5 mm. in diameter; tube about 1 mm. long; lobes entire or emarginate. Style very short, only slightly exceeding the calyx tube. Nutlets ovoid, olive-brown, shining, rounded at the apex, smaller than those of *M. repens*.

Habitat—Marshes.

Forma bracteata, form. nov.

Inflorescence bracteate at the base; usually one bract is present between the two lower flowers.

Locality—Foot of Rossgill Moor in Swindale, near Shap, Westmorland, C. Bailey (Herb. Bailey, Manchester).

Myosotis caespitosa Schultz, Prodr. Flora Starg., Suppl., p. 11, 1819.

Annual or biennial. Stems solitary or caespitose, 20-40 cm. high, erect, simple or branched from the base and elongate-fastigiate, terete, faintly ribbed, with adpressed hairs or glabrous. Leaves with adpressed hairs; the lower leaves lanceolate, narrowed into a short petiole, obtuse, sparingly hairy above, glabrous or almost so below; the upper leaves linear-oblong, subacute, sessile or subpetiolate, obtuse with a short apiculus, hairy above, subglabrous below. Inflorescence usually with one or more bracts at the base. Fruiting pedicels patent, two or three times as long as the calyx. Calyx with adpressed hairs; fruiting calyx campanulate; segments triangular-ovate, about ½-¾ of the calyx, subacute, open. Corolla sky blue, rarely white, small, 2-4 mm. diam.; limb plane; lobes rounded. Style very short, about half as long, rarely as long, as the calyx tube. Nutlets broadly ovoid, dark brown, shining, truncate at the base, slightly bordered, not keeled; rounded at the apex; average size 1.33 mm. × 1 mm.

Habitat—Marshy ditches, sides of pools and streams, and marshes.

Forma simplex Neuman in Sveriges Flora, p. 183, 1901.

Stem upright, simple, 8-15 cm. high. Lower leaves 1 cm. long (or longer), 3-4 mm. broad. The small forms frequently found in dune-slacks seem to come under Neuman's form.

Forma GLABRIUSCULA Rouy, Flore de France, x, p. 321, 1908.

Leaves almost glabrous.

Forma SUBMERSA Glück in Biol. und Morph. Untersuch. über Wasser und Sumpfgewächse. III. Die Uferflora, p. 297, 1911.

Plant submersed, 14-25 cm. long. Stem simple. Leaves 3-7.2 cm. long by 3.5-7.5 mm. broad. Not flowering.

Forma ALBIFLORA Wildeman & Durand in Prodr. Fl. Belg., iii, 584, 1899.

Flowers white.

Var. RADICANS Lange in Haandb. Danske Fl., ed. 3, 164, 1864.

Stems elongated, much branched, ascending, rooting, somewhat angular.

M. SICULA Guss., Fl. Sic. Syn., i, p. 214, 1842.

Annual or ? biennial. Root fibrous. Stems solitary or several, 5-30 cm., erect or decumbent, simple or with divaricate, flexuous branches, glabrous or sub-glabrous below with scattered hairs above. Hairs all adpressed. Lower leaves oblong-spathulate, attenuated into a very short petiole, 25-30 × 5-10 mm., obtuse, glabrous or subglabrous below, hairy with adpressed hairs or glabrous above. Upper leaves linear-oblong, obtuse, 10-20 × 3-4 mm., hairy on both sides, hairs adpressed, usually sub-glabrous. Inflorescence elongated, rarely short, flexuous; lower branches of the inflorescence usually divaricate; a few bracts are sometimes present at the base. Fruiting pedicels 1-3 times as long as calyx (usually as long), patent or reflexed, thickened above. Calyx 2½-3 mm. oblong, campanulate, usually with a few adpressed hairs at the base; segments oblong, obtuse, about ½ or more of the calyx, sub-connivent in fruit. Corolla blue, 2½-3 mm. in diameter, limb concave; lobes entire; tube shorter than calyx. Stigma short, about as long as the calyx tube. Nutlets pale or dark brown, shining, faintly bordered, not keeled, narrowly ovoid, rounded at the apex, average size 1-1.25 × 0.6-0.75 mm.

Habitat—Fixed sand-dunes in Jersey. On the Continent it also occurs in damp pastures, liable to floods in winter.

THE TAXONOMY OF PLANTS INTERMEDIATE BETWEEN MEDICAGO SATIVA L. AND M. FALCATA L. AND THEIR HISTORY IN EAST ANGLIA.

J. S. L. Gilmour.

TAXONOMY.

There exists a considerable difference of opinion among taxonomists on the status of forms intermediate between *Medicago sativa* L. and *M. falcata* L. By some they are regarded as the result of hybridisation between these two species (*e.g.*, Reichenbach, *Fl. Germ. Excurs.*, 504; Grenier & Godron, *Fl. Français*, i, 584; Wilkomm & Lange, *Prod. Fl. Hisp.*, iii, 378; Koch, Syn., ed. 3, i, 537; Hegi, *Ill. Fl. Mittel Europa*, iv, pt. 3, 1264). By others they are considered to include not only hybrids but also a distinct species or variety, usually cited under the name *M. sylvestris* Fries or *M. media* Pers. (*e.g.*, Lloyd, *Fl. de l'Ouest de France*, ed. 3, 79; Hy, *Journal de Botanique*, ix, 430; Rouy, *Fl. Fr.*, v, 12-13; Babington, *Man. Brit. Fl.*, ed. 10, 89; Druce, *Brit. Plant List*, ed. 2, 24; Butcher & Strudwick, *Further Ill. Brit. Pl.*, 111).

This latter opinion is largely based on two facts: firstly, that in East Anglia (*e.g.*, between Mildenhall and Thetford in Suffolk) and in France (on the sandy banks of the river Loire) populations of the intermediate forms occur where neither of the two species grows in close proximity; and, secondly, that many of these intermediate forms are perfectly fertile.

If, however, the extensive genetical, cytological, and agricultural literature on *M. sativa* and *M. falcata* is studied, there can be no doubt that all intermediate forms have resulted from hybridisation between these two species, as the following experimental facts clearly show.

1. It has been shown that reciprocal crosses between these species can readily be made experimentally (Urban, *Verhandl. d. Bot. Var. de Brand.*, 1877, 125, and many subsequent workers in Europe and America).

2. The pollen of *M. sativa* is prepotent as compared with that of *M. falcata* on the stigmas of the latter, and *vice versa* (Oakley and Garver, U.S. Dept. Agric., Bur. Pl. Industry, *Bull.*, 428, 58).

3. Under natural conditions both *M. sativa* and *M. falcata* are capable of self-pollination, though cross-pollination also occurs through the agency of honey bees and other insects. When the two species were grown together under conditions of open pollination, 42.7% of seed from *M. falcata* and 7.48% from *M. sativa* produced plants of hybrid origin (Waldron, *Journ. Amer. Soc. Agron.*, xi, 259-266). According to the author, the disparity between these figures is due to the comparative scarcity of flowers and pollen in *M. falcata*. Hayes and Garber (*Breeding Crop Plants*, 4) suggest that these two percentages should be averaged and doubled, giving the probable amount of cross-pollination between the species as 50%.

4. The seed production of the F_1 hybrid is much higher than that of either of the parents (Witte, *Sveriges Utsad. Tidskr. Årg.*, xxxi, 185).

5. When the F_1 generation is selfed the seed production of the F_2 is much lower than that of F_1 (Witte, *loc. cit.*).

6. When *M. sativa* is crossed with pollen from *M. falcata* or a hybrid plant the seed production is higher than when it is selfed, or pollinated by another plant of the same species (Piper, U.S. Dept. Agric., Bur. Pl. Industry, *Bull.*, 75). This result, however, was not fully confirmed by Waldron, *op. cit.*

7. F_1 hybrids show an increase in weight over the parents when grown under the same conditions (Waldron, *Journ. Amer. Soc. Agron.*, xii, 133). When *M. sativa* is selfed a pronounced and progressive reduction of vegetative vigour takes place during subsequent generations (Kirk, *Scientific Agriculture*, viii, No. 1).

8. The range of variation in forms produced in F_1 and subsequent generations amply covers the characters assigned to *M. sylvestris* by systematists (*e.g.*, Rouy, *loc. cit.*) who do not consider it of hybrid origin (Witte, *loc. cit.*; Hagem, *Nyt Mag. f. Nat.*, lvi, 149, and others).

9. *M. sativa* has 2n = 32 chromosomes and *M. falcata* either n = 32 or 2n = 16. "Grimm" lucerne (an important agricultural variety intermediate between *M. sativa* and *M. falcata*) has 2n = 32, while "a *M. media-like* plant" had 2n = 34, 35, or 36, and n = 16, 17, or 18, which, together with certain cytological irregularities and variability of pollen grains, indicates its probable hybrid origin (Fryer, *Canad. Journ. Research*, iii, 3).

It is clear, therefore, from these facts, that when populations of *M. sativa* and *M. falcata* are growing in close proximity crossing and back-crossing will inevitably take place and that, in course of time, hybrid plants will be favoured at the expense of the parents. This is undoubtedly what has occurred in East Anglia and accounts for the present large populations of intermediate forms. It is probable that the areas occupied by native *M. falcata* are gradually being encroached upon by hybrid forms, in a manner analogous with that described for the oxlip and primrose by Miller Christy (*Journ. Linn. Soc.*, xxiii, 172). Dr A. H. Evans states that during the last 30 or 40 years the populations of "*M. sylvestris*" have considerably increased in several East Anglian localities. The absence, in modern times, of pure *M. falcata* from the banks of Loire (Hy, *loc. cit.*; Lloyd, *Flore de l'Ouest de la France*, 79, 1876) must be accounted for by assuming that it was once present and that it has subsequently disappeared owing to constant crossing with *M. sativa*. This assumption receives support from an earlier work by Lloyd (*Flore de la Loire-Interieure*, 60, 1844), where he records, under *M. falcata*, plants with "fleurs . . . ord. jaunes, qqf. noir-violacé ou passant du jaune au vert et au violacé." It seems probable that at that date (1844) there still existed relatively pure *M. falcata* ("fleurs . . . ord. jaunes"), but that in 1876 it had been replaced by hybrid plants.

Since *M. sylvestris* Fries cannot be maintained as a distinct species, the earliest name applied to the hybrid must be used. As shown by Hegi (*loc. cit.*) this is *M. varia* Martyn, *Flora Rustica*, iii, 87 (1792).

M. VARIA IN EAST ANGLIA.

It occurred to the writer that confirmation of the hybrid origin of *M. varia* might be found in an examination of the early East Anglian records for *M. sativa*, *M. falcata*, and *M. varia*.

The following is a list of the records for *M. varia* (recorded, of course, under various names) for East Anglia prior to 1805:—

1. " Bank on the roadside a little beyond the new Bridewell, Bury," Sir T. G. Cullum in *Bot. Guide*, 561 (1805).
2. " Between Bury and Saxham," Sir T. G. Cullum, *loc. cit.*
3. " Fields at Bradwell, and Burgh Castle," Mr Wigg, *loc. cit.*
4. " On Yarmouth Denes," Mr Wigg, *op. cit.*, 441.
5. " Lakenham [near Norwich], 1783 (Hb. Smith—under *M. falcata*)" Nicholson, *Flora of Norfolk*, 69.

On searching the early agricultural records it was found that near each of these localities lucerne was being grown at the end of the 18th century. Thus Arthur Young cultivated it at his home at Bradfield, just south of Bury (Young, *Gen. View Agric. Suffolk*, 119, 1797); John Ramey at Ormsby, near Yarmouth, in 1763 (Young, *Tour Through East England*, ii, 142, 1771), and Nockhold Thompson at Earlham, near Norwich, in 1769 (Young, *op. cit.*, 94). In all these localities there are also records for *M. falcata* prior to 1805. Further, at Elveden, where there now exists one of the largest populations of *M. varia* in East Anglia, Lord Albermarle was growing an extensive crop of lucerne in 1803 (Rodwell, *Journ. Roy. Agr. Soc.*, 1842, 238). Finally, there is an interesting account by Thomas Le Blanc (*Ann. Agric.*, xv, 277-285, 1791) describing the finding of a single plant of " variegated medick " among populations of *M. falcata*, near Cavenham. Le Blanc made experiments with this plant for agricultural purposes, propagating it by seed until he had sufficient to grow it as a crop. Cavenham is now one of the localities where *M. varia* is common, the present populations having presumably been initiated in the 18th century by Le Blanc's single plant.

On this historical evidence alone, it seems impossible to resist the conclusion that in East Anglia *M. varia* arose during the eighteenth century as the result of hybridisation between native *M. falcata* and cultivated lucerne. Indeed, in isolated localities, it appeared considerably earlier, since Ray (*Hist. Plant.*, 960, 1686) records that he found a Medick " flore purpurascente ex viridi varientem " near Norwich. I have been unable to find a specific record for *M. sativa* near Norwich in the 17th century, but as it had been grown in private gardens since the 16th century (Turner, *Herbal*, ii, 52-53, 1562; Lyte, *Herbal*, 500, 1578) it is quite possible that it was present in the neighbourhood of Norwich at the time of Ray's record.

The author's thanks are due to Mr T. G. Tutin and Dr W. S. Southworth for help with the literature quoted in this paper.

SPIRAEA ULMARIA L., VAR. DENUDATA Auct. Plur.

Eric Drabble, D.Sc., F.L.S.

The common meadowsweet occurs in two well-marked forms, the commoner having the leaves green above, white and downy beneath, the other having concolorous leaves, green above and below. To the second of these the name *denudata* has been applied by many authors and this name was introduced into Babington's *Manual*, ed. 9, by H. & J. Groves, where the plant is unfortunately described as " β *denudata* (Boenn.); st.-l. green and glabrous on under surface."*

Plants with the leaflets entirely glabrous below must be very rare in this country; I have never seen one either living or as a herbarium specimen, though Beck and Rouy (see below) both make reference to such a state on the Continent.

The plant with concolorous leaves, green above and below, was first described by Presl, *Fl. Cechica*, p. 101 (1819), thus:—" *Spiraea denudata* fol. glabris subtus ad venas pubescentibus, pinnis cordato-ovatis," while for *S. Ulmaria* he gives " fol. subtus albido-tomentosis, pinnis lanceolatis."

Hayne, *Arzneykunde gebrauchlichen Gewächse*, p. 31 (1821), gives:— *S. Ulmaria* " α *tomentosa* foliis subtus albo-tomentosis " and " β *denudata* foliis concoloribus utrinque glabris," but it should be noted that he goes on at once to say " *Spiraea denudata* . . . foliis concoloribus glabris subtus advenas pubescentibus . . . ," quoting from Presl, *Fl. Cech.*, as above.

Boenninghausen, who is given as the authority for *denudata* in *Bab. Man.*, ed. 9, gives in *Prodr. Fl. Monast.*, p. 146 (1824), " β *denudata* foliis subtus denudatis concoloribus;" he does not say " glabrous on the undersurface," and there can be no doubt that in using the name *denudata* he had Presl's plant in view and did not intend to limit the application to a completely hairless form.

Neilreich, *Fl. v. Nieder Oesterreich*, p. 917 (1859), gives:—*S. Ulmaria* L., " α *discolor*, Blätter auf der Rückseite grau- oder weissfilzig," and " β *concolor* Blätter beiderseits kahl und gleichfärbiggrün. Manchmal sind die untern Blätter rückwärts filzig, die obern völlig kahl, oder die Blattabschnitte sind rückwärts nur am Rande graufilzig eingefesst oder geschekt."

Beck, *Fl. v. Nieder Oesterreich*, p. 764 (1890), under *S. Ulmaria* distinguishes " α *glaberrima* Beck, Fl. Süsbosn. in Ann. Natürl. Hofm., ii, 118, Blätter einfarbig, dabei interseits ganz kahl," and " β *denudata* Beck, *l.c.*, an den Nerven flaumig und zwischen denselben kahl oder zerstreut behaart (f. *pubescens* Beck, *l.c.*).'' Of these he makes α *glaberrima* synonymous with *S. Ulmaria*, var. *denudata* Hayne non Presl, apparently overlooking Hayne's note and reference to Presl's description, while β *denudata* he synonymizes with *S. denudata* Presl and β *concolor* Neilr.

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*It is significant that Druce in " Hayward " rightly gives " St.-ls. green and nearly glabrous below."

Hegi, *Illustr. Fl. v. Mitteleur.*, iv, 2, p. 973 (1923), gives var. *denudata* (Presl) Beck (= *Spiraea denudata* Presl = *S. Ulmaria* L., var. *concolor* Neilr. = *Filipendula denudata* Fritsch, " Blattspreiten auch underseite grün nur auf den Nerven ± behaart. Selten ganz kahl (f. *glaberrima* Beck).''

It was shown by Yapp in *Anns. Bot.*, 1912, pp. 815-870, that var. *denudata*, with leaves concolorous but always more or less hairy on the under surface, reproduces its distinctive characteristics in successive development of the shoots from year to year in varying conditions of habitat. It was never induced to become really hairy even when grown in dry sunny exposed situations. He found that in the type-form as well as in *denudata* the seedling leaves and the first formed leaves of each year's growth were glabrous. In *denudata* these are followed by increasingly hairy leaves, the hairiness being chiefly confined to the larger veins, the general pubescence being absent, while in the typical form there is a passage from the first glabrous leaves through one, two, or occasionally more cauline leaves before the fully white and hairy condition is attained. In a few instances intermediates with only the uppermost leaves of the flowering shoot white occurred, but in all plants, type, intermediate and *denudata*, the lowest leaves are glabrous and the cauline increasingly hairy as the shoot is ascended.

It seems evident, then, that there are two well-marked genetic conditions, namely, the white and the denudate under surface of the leaf.

Our plants then may be grouped as follows:—

SPIRAEA ULMARIA L.

Var. TOMENTOSA Hayne, 1821 (var. DISCOLOR Neilreich, 1859), with the leaves on the flowering stem white or greyish-white tomentose below.

Var. DENUDATA (Presl), 1819 (var. CONCOLOR Neilreich, 1859), with the leaves green on both surfaces generally hairy on the veins (perhaps sometimes entirely glabrous, f. *glaberrima* Beck).

Rouy, *Fl. France*, vi, p. 152 (1900), makes use of another pair of characters, namely the crisped and undulate or plain borders of the leaves, and on these characteristics he groups the forms thus:—

α NIVEA Wallr.: lvs. discolorous with the lower surface white tomentose and margins crisped and undulate.

β GLAUCA Wallr.: lvs. discolorous with lower surface finely tomentose glaucescent and margins plain, not crisped.

γ UNICOLOR Rouy & Camus: lvs. concolorous pubescent on the veins on the lower surface, margins plain, not crisped.

δ GLABERRIMA Rouy & Camus: lvs. concolorous, shining, entirely glabrous, margins more or less crisped and undulate.

Yapp has placed *tomentosa* and *denudata* on a satisfactory foundation, and until the constancy or otherwise of the crisped and plain margins has been properly tested it would be very unwise to adopt these features as the basis of named varieties.

LOCAL FLORAS.

THE LATE G. CLARIDGE DRUCE.

[We have had several recent enquiries as to the floral bibliography of particular counties and therefore think it advisable to publish the following interesting list compiled by the late Dr G. C. Druce.—Ed.]

Subjoined is a quite imperfect list of county floras and florulas, as well as isolated lists of plants which have appeared in periodicals. Naturally the counties with recent general floras have fewer of the smaller references given, since a proper flora is supposed to include these previously published records. In many instances this is not done exhaustively. Naturally in a long run of periodicals like the Scottish Naturalist (Scot. Nat.), the Annals of Scottish Natural History (Ann. Scot. Nat. Hist.), the Edinburgh Botanical Society's Transactions (Trans. Bot. Soc. Edin.), the Journal of Botany (Journ. Bot.) and the Reports of the Botanical Society and Exchange Club of the British Isles (Rep. B.E.C.), want of space has led to the omission of many records. It is hoped, however, that those supplied may prove really useful, but it is as a word of caution that one says that it is a selection only, and not by any means an exhaustive list. One did want to make the list of counties which have a recently published general flora fairly complete, and thus show where to make an attack upon any unworked areas.

GREAT BRITAIN (50,874 square miles).

Botanist's Guide, Turner and Dillwyn, i, 365; ii, 304, 1805.

New Botanist's Guide, H. C. Watson, 2 vols., 674, 1835 and 1837.

Plants through England and Wales, J. R. Matthews in Ann. Bot., 277, 1893, etc.

Botanical Bibliography of the British Counties, H. Trimen, Journ. Bot., 66, 108, 155, 178, 233, 1874.

Census Numbers, G. C. Druce, Journ. Bot., 217, 1905.

Botanical Bibliography of the S.E. Counties, E. G. Boulger, Trans. S.E. Union, 1899.

Topographical Botany, 2nd Ed., xlvii+612, 1883. Map. 1st Suppl., 118, 1905; 2nd Suppl., 99, 1929-30 (Journ. Bot.).

Alien Flora of Britain, S. T. Dunn, xvi + 208, 1906.

English Plant Names from the 10th-15th Century, John Earle, cxii + 122, 1880.

Naturalised Plants (DC. Géographie Botanique), Phyt., 449. 1858.

Extinct and Dubious Plants of Great Britain, G. C. Druce, Rep. B.E.C., 731-799, 1919.

British Plant List, G. C. Druce, ed. ii, xlii + 154, 1928; ed. i, xvi + 104, 1908.

Dictionary of English Plant-Names, J. Britten and R. Holland, xxviii+ 618, 1880.

Comital Flora, G. C. Druce, xxxii + 407, 1932. Map.

CHANNEL ISLANDS—SARNIA (75 square miles).

JERSEY (45 square miles).

Primitiae Florae Sarnicae, C. C. Babington, xvi + 132, 1839.

G .Henslow, Phyt., 633, 1858.

M. J. Gay MS. at Kew, G. C. Druce, Rep. B.E.C., 138, 1917.

Additions, J. Piquet, Phyt., 1090, 1853.

List of Phanerogams, J. Piquet, Bulletin of Jersey Society, 1896. 721 species.

Flora of the Island of Jersey, L. V. Lester-Garland, xvi + 205, 1903. Map. Engler System. Notes, do., Journ. Bot., 64, 1901.

Notes, H. Trimen, Journ. Bot., 200, 1871; G. C. Druce, *l.c.*, 395, 419, 1907; C. E. Salmon, *l.c.*, 16, 1913; H. W. Pugsley, *l.c.*, 327, 1914.

GUERNSEY (24 square miles).

Flora of Guernsey and the Lesser Channel Isles, E. D. Marquand, 501, 1901. Map. Flowering Plants 809, Mosses and Liverworts 185, Fungi 612, Lichens 309, Algae 305, Diatoms 323. Notes on Flora, do., Journ. Bot., 205, 1905.

LESSER CHANNEL ISLES.

Alderney, E. D. Marquand, Journal of the Guernsey Society, 1902.

Alderney, Herm, *l.c.*, Mrs McCrea. Additions, Mrs McCrea, *l.c.*, 1923.

Brechou, C. P. Hurst, *l.c.*, 1902.

Sark, M. M. Bull, Journ. Bot., 199, 1872; W. F. Miller, *l.c.*, 347, 1892.

ENGLAND.

VICE-COUNTIES.

CORNWALL, 1 W., 2 E. Artificial boundary. 868,167 acres.

Flora, F. Hamilton Davey, lxxxviii + 570, 1909. Map, Botanologia. Ferns. 1180 species. A Tentative List was issued in 1902.

Supplement, E. Thurston and C. C. Vigurs, xx + 172, 1922. Includes memoir of F. H. Davey.

N.E. Cornwall Plants, T. Archer Briggs, Journ. Bot., 336, 1883.

Victoria County History, Botany, F. H. Davey, 1906.

Notes, F. H. Davey, Journ. Bot., 354, 1900; 131, 1906; G. C. Druce, *l.c.*, 29, 1906; G. S. Gibson, Phyt., 696, 1846; Rev. C. A. Johns, *l.c.*, 726, 1846.

E. Thurston and C. C. Vigurs, Additions, Journ. R.I.C., 1926.

Scilly Isles, F. Townsend, Journ. Bot., 102, 1864; A. Somerville, *l.c.*, 118, 1893.

Cornwall and Devon Notes, Rev. W. Moyle Rogers, Journ. Bot., 172. 1909.

Cornish Plants. H. W. Pugsley, Journ. Bot., 231, 1906.

N. Cornwall, H. W. Pugsley, Journ. Bot., 88, 1930.

DEVONSHIRE, 3 S., 4 N. Artificial boundary. 1,671,364 acres.

No recent Flora. One is contemplated by Torquay N.H.S.

Flora of Devon, Rev. J. P. Jones and J. F. Kingston, 217, 1829. 774 species.

Flora of Totnes, S. Hannaford, 1851.

Flora of Devon and Cornwall, I. W. N. Keys, 1866-70. Issued in parts.

Flora of Taw and Torridge, Phyt., 755, 1852.

Teignmouth, R. C. Jordan, Phyt., 827, 1844.

Lynmouth, T. Clark, Phyt., 742, 1852.

Torquay, E. Lees, Phyt., 237, 1851.

Flora of Plymouth, T. Archer Briggs, xxxviii+432, 1880. Map. Bibliography. 876 species. S. Devon, do., Journ. Bot., 293, 1878.

Braunton, Dr F. R. Elliston-Wright, pp. 106, 1926.

S.E. Devon Notes, Rev. W. Moyle Rogers, Journ. Bot., 15, 1875; 9, 1880.

S. Devon, T. Archer Briggs, Journ. Bot., 292, 1878.

A. H. Wolley-Dod, Journ. Bot., 10, 1910.

Teign Basin, Rev. W. Moyle Rogers, Journ. Bot., 70, etc., 1882.

Tamar, Rev. W. Moyle Rogers, Journ. Bot., 8, etc., 1886.

N. Devon, Rev. W. Moyle Rogers, Journ. Bot., 9, 1882.

Notes, G. C. Druce, Journ. Bot., 9, 1904.

Torquay, etc., Miss Larter and W. P. Hiern, Rep. Devon Ass., 1917 et seq.

Bigbury Bay, S. Devon, Rev. E. S. Marshall, Journ. Bot., 200, 1895; Notes, *l.c.*, 140, 1916.

SOMERSET, 5 S., 6 N. Artificial boundary. 1,037,594 acres.

Flora, Rev. R. P. Murray, lxi + 437. 1896. Old authors cited. 1079 species (R.D.C., 1034).

Supplement, Rev. E. S. Marshall; iv + 242, 1914. Map. Notes, do., Journ. Bot., 115, 1906; 220, 1907; 252, 1908; 255, 1909; 281. 1911; 153, 1914; 122, 1915; 97, 1916; 179, 1917; 136, 154, 1918; 147. 175. 1919.

Geographical Distribution of Vegetation, C. E. Moss, 71, 1907. Map.

Mid-Somerset, Rev. R. P. Murray, Journ. Bot., 42, 328, 1882.

Bristol, J. Walter White (see under Gloster).

Flora Bath, H. Gibbes.

Taunton Bot. Society Report, 1924.

Wells, Rev. T. F. Ravenshaw, Phyt., 132, 1857.

Steep Holm, Rev. R. P. Murray, Journ. Bot., 1868; R. C. McLean and H. A. Hyde, *l.c.*, 167, 1924.
Cheddar, J. Lloyd, Phyt., 237, 1857.
Flora Bathonensis, C. C. Babington, 68, 1834.
C. E. Salmon, Journ. Bot., 408, 1899.
Weston-super-Mare, G. S. Gibson, Phyt., 757, 1843; St Brody, Flora, 1856.
Berrow Flats, H. Stuart Thompson, Proc. Brist. Nat. Soc., 1928.
Steart Island, H. Stuart Thompson, Journ. Bot., 1, 1924.

WILTSHIRE, 7 N., 8 S. Artificial boundary. 864,101 acres.

Flora, Rev. T. A. Preston, lxix + 436, 1888. Map, no Ferns.
Additions in Marlborough Nat. Hist. Soc. Reports.
Notes, G. C. Druce, Journ. Bot., 274, 1885; 24, 1886.
Notes, T. A. Preston, Journ. Bot., 376, 1888.
Flora of Wilts, T. B. Flower, Wilts. Arch. and N.H. Soc. Mag., 1857-74.
Wilts Notes, Rev. E. S. Marshall, Journ. Bot., 166, 1904; 173, 1905.
Records, E. J. Tatum, Journ. Bot., 56, 1895.

DORSETSHIRE, 9. 625,612 acres.

Flora, J. C. Mansel-Pleydell. Ed. ii, xxxviii+368, 1895; ed. i, 320, 1874. Map. 989 species.
E. F. Linton, Journ. Bot., 236, 1904; 73, 378, 417, 1909; 27, 1912.
Flora of Bournemouth, E. F. Linton, see Hampshire. Includes Dorset plants.
Notes, Rev. W. Moyle Rogers, Journ. Bot., 135, 1880; 265, 291, 1884.
Portland, W. Bowles Barrett, Proc. Dorset. N.H. and Antiq. Field Club, 1912; H. Groves, Phyt., 601, 1858.
Weymouth, G. S. Gibson, Phyt., 735, 1843.
Roses, G. A. Boulenger, Journ. Bot., 16, 1920.
H. W. Pugsley, Journ. Bot., 40, 1914.
C. E. Salmon, Journ. Bot., 363, 1911.
Lyme Regis Plants, H. W. Pugsley, Journ. Bot., 365, 1911.

ISLE OF WIGHT, 10. 94,146 acres.

Flora Vectensis, W. Arnold Bromfield, xxxv + 678, 1856. Map. (ex Phytologist).
Supplement, A. G. More, Journ. Bot., 72, 135, 211, 1871. 800 to 900 species.
Notes, F. Stratton, Journ. Bot., 285, 1913; 232, 371, 1916.
Natural History, F. Morey, xx + 560, 1909. Map.
Thorold Wulff, Bot. Notiser, 58, 1896.
G. C. Druce, Journ. Bot., 394, 1906.
E. Drabble and J. W. Long, Rep. B.E.C., 734, 1931.
Alien Plants, J. W. Long, Rep. B.E.C., 758, 1931.

HAMPSHIRE. 11 S., 12 N. Artificial boundary. 958,896 acres.

Flora, F. Townsend, Ed. ii, xl + 658, 1904. Map. Old authorities cited. Ed. i, 524, 1883.

Additions, H. P. Fitzgerald, Trans. Hants Field Club, 35, 1887.

Dyer and Trimen, Journ. Bot., 317, 1864.

Selborne, Rev. J. Vaughan, Journ. Bot., 366, 1887.

Hayling Island, Rev. E. S. Marshall, Journ. Bot., 144, 1901.

Supplement to Flora, J. F. Rayner, xix + 132, 1929.

Aliens, J. F. Rayner, Proc. I.O.W. Nat. Hist. Soc., 1923, 1925.

South Hants, Rev. W. Moyle Rogers, Journ. Bot., 12, 1889, with many additions.

South Hants, Rev. E. F. Linton, Journ. Bot., 41, 1903.

Fareham, W. L. Notcutt, Phyt., 201, 1845; 491, 1846. 548 species.

Flora of Bournemouth, Rev. E. F. Linton, 290, 1900. Map. 2nd ed., 1919. Appendix, 1925.

Notes, Joseph Woods, Phyt., 259, 1848.

Victoria County History, Botany, F. Townsend and others, pp. 36.

SUSSEX, 13 W., 14 E. Artificial boundary. 932,471 acres.

Flora, Rev. F. H. Arnold, Ed. i, xxiii + 118, 1887. Inadequate. Ed. ii, 1907, scarcely differs.

Flora Sussex, T. H. Cooper, 1835, in Horsefield's History.

Notes, C. E. Salmon, Journ. Bot., 403, 1901; 8, 47, 1906; 17, 91, 1909.

T. Hilton. Various papers to Brighton N.H. and Phil. Soc., 1892.

W. Sussex, Rev. E. S. Marshall, Journ. Bot. 213, 1902; 227, 1903.

Notes, Leicester Warren, Journ. Bot., 193, 1877.

Notes, W. B. Hemsley, Journ. Bot., 194, 258, 1868; 299, 1872; Suppl., Journ. Bot., 1875.

Eastbourne, F. C. S. Roper, xliii + 168, 1875. 700 species.

E. Sussex, F. C. S. Roper, Journ. Bot., 369, 1881; W. Whitwell, *l.c.*, 102, 1902.

W. Sussex, Rev. E. S. Marshall, Journ. Bot., 213, 1902; 227, 1903.

KENT, 15 E., 16 W. Natural boundary. 975,965 acres.

Flora, F. J. Hanbury and Rev. E. S. Marshall, lxxxiv + 444, 1899. Bibliography.

Indigenous Botany, Milne and Gordon, 1793.

Notes, G. C. Druce, Journ. Bot., 350, 1902.

Rare Plants of S. Kent, G. E. Smith, 76, 1829.

Petiver Tour from London to Dover, 1714.

Kentish Botany, Phyt., 50, 83, 129, 173, 1854.

Rev. E. S. Marshall, Journ. Bot., 144, 1914.

Lessness Abbey Woods, St John Marriott, pp. 72, 1925. Phanerogams and Cryptogams.

Faversham, Rev. H. A. Stowell, Phyt., 249, 375, 1855; 100, 153, 180, 261, 1857.

Tonbridge Flora, T. F. Forster, ed. i, 1816; ed. ii, 1842.
Aliens, Woolwich, Col. A. H. Wolley-Dod, Journ. Bot., 370, 1892.
E. Jacob, Flora Faversham, 1777.

SURREY, 17. 461,833 acres.

Flora, C. E. Salmon. Begun by A. Bennett, continued by W. H. Beeby, and more recently by C. E. Salmon. Edited and completed by W. H. Pearsall, 688, 1931. Maps. Botanologia and previous works cited. 1289 plants, including some aliens.
Victoria County History, Botany, W. H. Beeby, pp. 35, 1902.
S.W. Surrey, S. T. Dunn, pp. 106, 1893.
Flora, J. A. Brewer, 1863.
Godalming, J. D. Salmon, Bot. Soc. London, 1849; Botanical Divisions, Phyt., 558, 1852.
W. B. Hemsley, Journ. Bot., 299, 1872. 1059 species.
Wandsworth, Irvine, Phyt., 330, 1859.
Reigate Flora, R. Luxford, 1838.
Bagshot Flora, H. W. Monckton, 1916; Journ. Bot., 251, 1919.
Notes, Rev. E. S. Marshall, Journ. Bot., 162, 1895.

ESSEX, 18 S., 19 N. Artificial boundary. 979,532 acres.

Flora, G. S. Gibson, l + 470, 1862. Much out of date.
Halstead, T. Bentall, Phyt., 400, 1845. 502 species.
Varenne, Phyt., 544, 1852; 1106, 1853.
Colchester and Hythe Quay. Aliens, G. C. Brown, Rep. B.E.C., 295, 1915.
Saffron Walden, G. S. Gibson, Phyt., 408, 838, 1844

HERTFORDSHIRE, 20. 404,523 acres.

Flora, R. H. Webb and W. H. Coleman, 1849. Supplement, 1851.
Flora, A. R. Pryor (edited by B. D. Jackson), viii + 588, 1887. Bibliography. 923 species, 193 aliens.
Victoria County History, Botany, J. Hopkinson, pp. 37, 1902.
Poplars, J. E. Little, Journ. Bot., 233, 1916.
Additions to Flora, Rev. R. H. Webb, Phyt., 156, 1857.
Further additions, Edward Edwards, Phyt., 197, 1857.
Gentians, E. J. Salisbury, Trans. Hertf. Nat. Hist. Soc., 1914.
Additions to Flora, J. E. Little, Journ. Bot., 44, 74, 1917.

MIDDLESEX, 21. 448,692 acres.

Flora, H. Trimen and W. T. Thiselton Dyer, xli + 428, 1869. Bibliography.
Hansfield, Phyt., 61, 1855-6.
Casuals, J. G. Cooper, Journ. Bot., 127, 1914.
Adventives, R. Melville and R. L. Smith, Rep. B.E.C., 444, 1927.
Harrow, W. M. Hind, pp. 198, 1876.

Hampstead Heath, National History, Hampstead Scientific Society, 328, 1914. Maps.
Harefield, J. Blackstone, 1737.
London Flora, Eyre de Crespigny, 180, 1877.
Casuals, J. E. Cooper, Journ. Bot., 127, 1914.
J. Benbow, Journ. Bot., 338, 1885; 14, 363, 1887; 120, 1890.
G. C. Druce, Journ. Bot., 269, 1910; 66, 1911.
C. E. Britton, Journ. Bot., 331, 1910.

BERKSHIRE, 22. 463,830 acres.

Flora, G. Claridge Druce, cxcvii + 640, 1897. Map. Bibliography. 994 species, 210 aliens, 470 varieties and hybrids.
Notes, G. C. Druce, Journ. Bot., 307, 1891; 327, 1893; 14, 1905; 195, 233, 1910.
Additions, G. C. Druce, Rep. B.E.C. Suppl., pp. 48, 1918. Additional species 24, aliens 100, varieties and hybrids 300.
Suppl. in Ashmolean Nat. Hist. Rep., 1918.
Thames Valley Drift Flora, H. W. Monckton, 1919.
Rev. W. Moyle Rogers, Journ. Bot., 339, 1887.
Streatley, W. Pamplin, Phyt., 153, 1854.

OXFORDSHIRE, 23. 479,230 acres.

Flora Oxoniensis, Prof. J. Sibthorp, xxiv + 422, 1794.
Flora, Rev. R. Walker, cxxxv + 338, 1833.
Flora, with Cryptogams, G. C. Druce, lii + 450, 1886. Ed. ii (no Cryptogams), cxxxi + 538, 1927. Bibliography. Meteorology (Bellamy). 1061 species.
Victoria County History, Botany, G. C. Druce, 1908.
Botany of the Upper Thames, British Association Handbook, G. C. Druce, 1926.
Mosses and Hepatics, G. C. Druce, Ashmolean Nat. Hist. Rep., 1921.
Plants, G. C. Druce, Journ. Bot., 227, 1890.

BUCKINGHAMSHIRE, 24. 479,360 acres.

Flora, G. C. Druce, cxxviii + 438, 1926. Map. Bibliography. Species 1027, aliens 325, varieties and hybrids 575.
Victoria County History, Botany, G. C. Druce, pp. 30, 1903.
J. Saunders, Journ. Bot., 249, 300, 1884; 271, 1889.
G. C. Druce, Journ. Bot., 307, 1891.
Great Marlow, G. G. Mill, Phyt., 983, 1844.
W. H. Summers, Notes on Flora, pp. 38, 1894.
Burnham Beeches, J. G. Baker, Journ. Bot., 276, 1917.

SUFFOLK, 25 E., 26 W. Division by longitudinal line. 948,269 acres.

Flora, Henslow and Skepper, 140, 1860.

Flora, Rev. W. M. Hind, xxxiv + 508, 1889. Map, Palaeontology.
Mildenhall, J. Townsend, Phyt., 581, 1846.
C. E. Salmon, Journ. Bot., 388, 1907.
East Anglian Botany, A. Bennett, 322, 1899.
Victoria County History, Botany, C. E. Salmon, 1912.
J. Andrews Suffolk Plants, G. S. Boulger, Journ. Bot., 257, 294, 323, 346, 1918.
T. Gissing, Phyt., 232, 323, 1855-6.

NORFOLK, 27 E., 28 W. Division by longitudinal line. 1,315,064 acres.

Flora, Rev. K. Trimmer, xl+195, 1866; Supplement, do., vii+73, 1885.
Flora, W. A. Nicholson, 214, 1914. Two Maps, no Botanologia. 1337 plants.
S.W. Norfolk, F. C. Newton, Journ. Bot., 51, 1913.
Harleston Flora, Rev. F. W. Galpin, 157, 1890.
Flora, H. D. Geldart, in Mason's Hist. of Norfolk, 1884. 506 species.
Sandringham, J. E. Moxon, Phyt., 596, 630, 1843.
J. E. Little, Norfolk Nat., 375, 1922-3.
Norfolk Botany in Bot. Guide, W. G. Clarke, Norf. Nat., 1920-21.
Utriculariae, W. G. Clarke and R. Gurney, Norfolk Nat., 1920-21.
Norfolk Notes, W. H. Burrell and W. G. Clarke, Journ. Bot., 267, 1911.
Ferns, Rev. W. S. Hore, Phyt., 95, 1851.
Norfolk Plants, W. G. Clarke, Journ. Bot., 191, 1917.
Norfolk Botany, Phyt., 395, 427, 1862-3.
Norfolk Notes, A. Bennett and C. E. Salmon, Journ. Bot., 94, 1902; 202, 1903.
Norfolk Notes, E. F. Linton, Journ. Bot., 208, 263, 1900; C. E. Salmon, *l.c.*, 190, 1919.
W. Winter, Phyt., 289, 1861.
B. Reynolds, Rep. B.E.C., 252, 1923.

CAMBRIDGESHIRE, 29. 315,168 acres. Isle of Ely, 238,073 acres.

Flora Cantabrigiensis, R. Relhan, Eds. i, ii. iii, 490, 1785.
Flora, C. C. Babington, lvi + 327, 1860. Takes in 3rd Edition of Relhan's Flora, 597, 1820. Species 997.
A Short Flora, A. H. Evans, 88, 1911. Lower Cryptogams, by Rev. P. G. M. Rhodes and others.
Notes, W. West, Jun., Journ. Bot., 246, 491, 1898.
A. Fryer MS., Hunts and Cambridge, Polygonaceae-Characeae, c. 1880, in Hb. Druce.
Whittlesea Fens, Rev. W. T. Bree, Phyt., 98, 1851.
Notes, A. Bennett, Journ. Bot., 243, 1899.
Notes, A. Hosking, Journ. Bot., 157, 1903.

BEDFORDSHIRE, 30. 302,942 acres.

Flora Bedfordiensis, Rev. C. Abbot, 350, 1798.

Wild Flowers, S. Beds, J. Saunders, Trans. Bedf. N.H. Soc., 1882; do., 1911, ex local papers.

Victoria County History, Botany, J. Hamson and G. C. Druce, pp. 30, 1904.

Flora, J. Hamson, 1906. 847 species.

W. Hillhouse, Plant List, 1876, 1877. 700 species, including aliens.

S. Beds, J. Saunders, Journ. Bot., 71, 175, 328, 1883; 209, 1889.

Ivel Valley, J. Saunders, Journ. Bot., 338, 1889.

Notes, J. E. Little, Journ. Bot., 306, 1919.

HUNTINGDONSHIRE. 31. 233,985 acres.

Victoria County History, Botany, G. C. Druce, pp. 52, 1926. Botanologia. 790 species.

Plants, A. Fryer, Journ. Bot., 105, 1884.

W. R. Linton, Journ. Bot., 149, 1884.

F. A. Paley, Peterborough List, 1860.

G. C. Druce, Rep. B.E.C., 949, 1925.

NORTHAMPTONSHIRE, 32. 588,148 acres. Soke of Peterborough, 53,464 acres.

Flora, G. C. Druce, cxlii + 304, 1930. Botanologia. 997 species. Much of it appeared in the Northampton Nat. Hist. Soc. Journ., 1880-1920.

Victoria County History, Botany, G. C. Druce, pp. 39.

Notes, G. C. Druce, Journ. Bot., 42, 79, 116, 1880; 285, 1881; 370, 1886. Mostly new records.

F. A. Paley, Peterborough List, 1860.

Daventry, W. L. Notcutt, Phyt., 500, 1842.

J. Morton, Nat. Hist., 1712.

GLOUCESTERSHIRE, 33 E., 34 W. Artificial boundary. 805,842 acres.

No complete Flora. One in preparation by Rev. H. J. Riddelsdell.

Flora and Fauna, C. A. Witchell and W. B. Strugnell, 302, 1892. Only 40 pages of Botany.

Records, Rev. H. J. Riddelsdell, Journ. Bot., 222, 248, 1911; 350, 1919.

Flora of Bristol, J. Walter White, 722, 1912. Map, Botanologia. 1692 species dealt with. Natives and permanently established species 1178. Includes also Somerset localities.

Supplementary Notes, J. W. White, Journ. Bot., 11, 40, 1918.

Flora, J. H. Burkill, Cheltenham Nat. Sci. Soc., 1893.

Swete, Flora Bristol, 1854.

Records, Rev. W. Moyle Rogers, Journ. Bot., 346, 1886.

Records, Rev. H. P. Reader, Journ. Bot., 368, 1886.

Additions to Flora W. Gloster, W. Shoolbred, Journ. Bot., 263, 311, 1894; 29, 1896.

W. Gloster Aliens, G. C. Druce, Rep. B.E.C., 512, 1916.
Bristol Plants, N. Y. Sandwith, Journ. Bot., 21, 1921.
Cotteswolds, James Buckman, Phyt. 137, 1842.
C. Bucknall and J. W. White, Journ. Bot., 16, 1910.
W. Gloucester, Miss I. M. Roper, Journ. Bot., 358, 1908.
Notes, Fry and White, Journ. Bot., 115, 1893; 123, 1897, 417, 1899; (with Cedric Bucknall), 55, 1903.

MONMOUTHSHIRE, 35. 349,552 acres.

New Records, Rev. H. P. Reader, Journ. Bot., 368, 1886.
New Records, W. Whitwell, Journ. Bot., 308, 1891.
Additions to Flora, W. A. Shoolbred, Journ. Bot., 263, 1894; 29, 1896.
Chepstow Flora, W. A. Shoolbred, x + 140, 1921. Map, includes Mosses.
Records, G. C. Druce, Journ. Bot., 335, 1908.

HEREFORDSHIRE, 36. 538,724 acres.

Flora, Rev. W. H. Purchas and Rev. A. Ley, xxxvii + 549, 1889. Map. Mosses, Lower Cryptogams.
Additions, A. Ley, Journ. Bot., 207, 1894; 317, 1907.
Ross, Rev. W. H. Purchas, Phyt., 649, 1846.
The Dowards, A. T. Willmott, Phyt., 340, 1851.

WORCESTERSHIRE, 37. 458,332 acres.

Flora, John Amphlett and Carleton Rea, xxxiv + 654, 1909. Map, Bibliography and Lower Cryptogams. 1192 numbered species.
Survey of E. Worcester, J. Humphreys, Proc. Birmingham Nat. Hist. Soc., pp. 61, 1917.
R. F. Towndrow, Journ. Bot., 57, 1913.
Wyre Forest, Phyt., 1103, 1853; 151, 281, 343, 399, 472, 1856.
Botany of the Malvern Hills, E. Lees, 1843; 2nd ed., 1852; 3rd ed., 1868. 833 species and Cryptogams.

WARWICKSHIRE, 38. 605,275 acres.

Flora, J. Bagnall, xxxiv + 519, 1891. Lower Cryptogams, Fungi with W. B. Grove, Map, Bibliography. Species 905, Aliens 150, Varieties 236, Mosses 236, Hepatics 44, Lichens 101, Fungi 727.
Additions, J. Bagnall, Midland Nat., 289, 1892.
J. Bagnall, Journ. Bot., 65, 1882.
Narcissus, Rev. W. T. Bree, Phyt., 945, 1850.
Midland Flora, T. Purton, 1820.
Ferns, etc., Coventry, T. Kirk, Phyt., 809, 1846.
Rarer Warwickshire Plants, T. Kirk, Phyt., 969, 1847.
Plantae Varvicenses, William Grove Perry, 1820.
Harbury Cutting, E. Marsden Jones, Rep. B.E.C., 721, 1919.

Rugby School Nat. Hist. Soc. Reports, Various Lists 1868 et seq., L. Cumming and others. Mosses, 1893.

Rev. W. T. Bree, Contributions to London Mag., 1830; Rarer Plants of Warwick, 1831.

STAFFORDSHIRE, 39. 745,318 acres.

Flora, J. E. Bagnall, pp. 74, 1901. Suppl. to Journ. Bot.

Flora, N. Staffs, W. Boydon-Ridge, 173, 1931.

Notes, Rev. W. H. Painter, Rep. N. Staffs Nat. Hist. Soc. (various dates).

Dovedale, Rev. W. H. Purchas, Journ. Bot., 181, 196, 1885.

Matlock, J. G. Baker and W. W. Newbould, Journ. Bot., 334, 1884.

Warslow, Rev. A. Bloxam, Phyt., 75, 1855.

Aliens of Burton-on-Trent, Sir R. Curtis, Bt., Rep. B.E.C., 465, 1930.

Saline Flora, Rev. H. P. Reader, Journ. Bot., 278, 1923.

SHROPSHIRE, 40. 861,809 acres.

Flora, Rev. W. A. Leighton, x + 573, 1841. Excellent sedge figures.

Aliens, J. C. Melvill, Journ. Bot., 242, 1924.

Shrewsbury, W. Phillips, 1878.

Ludlow, F. Westcott, Phyt.. 567, 1843.

Notes, W. E. Beckwith, Journ. Bot., 48, 1881; 342, 363, 1882; 182, 1901.

A. Bennett, Journ. Bot., 380, 1898.

WALES, 7,466 square miles.

North Wales, A. W. Bennett, Phyt., 771, 1850.

J. Ball, Bot. Gaz., i, 107, 1849.

Samuel Brewer's Diary, H. A. Hyde, Rep. B.E.C. Suppl., 1930.

Lightfoot's Visit, Rev. H. J. Riddelsdell, Journ. Bot., 290, 1905.

Flora of Wales, Journ. Bot., 10, 1898.

GLAMORGANSHIRE, 41. 520,456 acres.

Flora, A. H. Trow, vol. 1, 209, 1911.

Flora, Rev. H. J. Riddelsdell, pp. 88, 1907, Suppl. to Journ. Bot. Short Botanologia. Notes. Journ. Bot., 397, 1909.

Cardiff, J. Storrie, 130, 1886.

Adventive Flora of Cardiff, A. E. Wade and R. L. Smith, Rep. B.E.C., 999. 1925; Additions. do., 181, 1926.

Additions, T. Westcombe, Phyt., 780, 1844.

Swansea, J. W. G. Gutch, Phyt., 104, 118, 141, 180, 1844.

Notes. A. G. More, Journ. Bot., 43, 1884.

Notes, David Fry, Journ. Bot., 57, 1888.

Plants, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 248, 1902.

Worms Head, Rev. H. J. Riddelsdell, Journ. Bot., 89, 1911.
Records, Rev. H. J. Riddelsdell, Journ. Bot., 397, 1909.

BRECON, 42. 469,281 acres.

No general Flora.
Notes, Rev. W. Moyle Rogers, Journ. Bot., 17, 1899.
Rubi, Rev. W. Moyle Rogers, Journ. Bot., 193, 1899.
Builth, including Radnor, Rev. H. J. Riddelsdell, Proc. Cotteswold Club, 1909.
List, W. Bowles Barrett, Rep. Bot. Rec. Club, 1884, 1887.
Notes, W. Bowles Barrett, Journ. Bot., 39, 107, 145, 1885.
List, T. Westcombe, Phyt., 781, 1843.
Notes, R. W. Phillips, Journ. Bot., 354, 1892.
The Breconshire Border, List of Plants as Appendix, R. W Phillips, 1926.
Records, G. C. Druce, Journ. Bot., 335, 1908.
Rev. H. J. Riddelsdell, Journ. Bot., 344, 1901.

RADNOR, 43. 301,165 acres.

No general Flora.
List, Rep. Bot. Rec. Club, 246, 1874; 246, 1883; 146, (1886) 1887.
List, T. Westcombe, Phyt., 781, 1843.
Notes, H. N. Ridley, Journ. Bot., 170, 1881.
Rev. W. Moyle Rogers, Journ. Bot., 17, 1899.
Rubi, Rev. W. Moyle Rogers, Journ. Bot., 193, 1899.
Records, G. C. Druce, Journ. Bot., 335, 1908.

CARMARTHEN, 44. 588,472 acres.

No general Flora.
Notes, A. Bennett, Journ. Bot., 83, 1908.
Nat. Hist., T. W. Barker, 1905. 831 species.
Records, Rev. H. J. Riddelsdell, Journ. Bot., 344, 1901; 71, 1907.

PEMBROKE, 45. 393,003 acres.

No general Flora.
S. Pembroke, Botany, C. C. Babington, Phyt., 258, 1863.
A. G. More, Journ. Bot., 43, 1884.
E. F. Linton, Journ. Bot., 357, 1905.
A. Wallis, Journ. Bot., 347, 1919.
E. Lees, Phyt., 1013, 1853.
List, W. R. Linton, Journ. Bot., 52, 1901.
New Records, A. H. G. Alston and C. I. & N. Y. Sandwith, Journ. Bot., 237, 1932.

CARDIGAN, 46. 443,189 acres.

No general Flora.
Lists, Rep. Bot. Rec. Club, 147, 1886-7.
Aberystwith, E. Lees, Phyt., 38, 1841.
N. Cardigan, J. H. Burkill and J. C. Willis, Journ. Bot., 4, 54, 1894.
Plants, Rev. E. S. Marshall, Journ. Bot., 247, 1900.
Records, R. F. Towndrow, Journ. Bot., 72, 1907.

MONTGOMERY, 47. 510,110 acres.

No general Flora.
List, Rev. A. Ley, Rep. Bot. Rec. Club, 149, 1887.

MERIONETH, 48. 422,372 acres.

No general Flora.
List, Rev. A. Ley, Rep. Bot. Rec. Club, 1873, 1876, 1877.
Dovey Estuary, R. H. Yapp and D. Jones, Journ. of Ecol., 1917 (including Cardigan).
Rev. W. Moyle Rogers, Journ. Bot., 338, 363, 1886.
W. R. Linton, Journ. Bot., 359, 1895.

CARNARVON, 49. 366,005 acres.

Fl. Anglesey and Carnarvon, J. Griffith, xx + 282, 1895. Maps, Cryptogams and Welsh Names.
Rev. A. Ley, Rep. Bot. Rec. Club, 152, 1886.
Great Orme, E. Lees, Phyt., 869, 1850.
Bickham, Marshall and Shoolbred, Journ. Bot., 241, 1913.
List, A. Wallis, Journ. Bot., 349, 1919.
Snowdon, J. Barton, Phyt., 145, 1857.
Notes, C. E. Salmon and W. G. Travis, Journ. Bot., 316, 1917.
Notes, Rev. W. Moyle Rogers, Journ. Bot., 338, 363, 1886.
Notes, G. C. Druce, Journ. Bot., 181, 1902.
Notes, H. W. Pugsley, Journ. Bot., 19, 1923.

DENBIGH, 50. 426,080 acres.

No general Flora. One in preparation by A. A. Dallman.
Notes, Rev. W. Moyle Rogers, Journ. Bot., 338, 363, 1886.
Flora, A. A. Dallman, pp. 50, Suppl. to Journ. Bot., 1911; Further Notes, pp. 43, Suppl. to do., 1913.
Wrexham, Phyt., 421, 1843.

FLINT, 51. 163,707 acres.

R. Brown, Journ. Bot., 357, 1885.
Rev. H. Lewis Jones and Dr H. Parsons, Rep. Bot. Rec. Club, 64, 1882. 355 species.

Flora, A. A. Dallman, Journ. Bot., 138, 1907; 187, 222, 1908; 40, 73, 90, 204, 1910; 8, 1911. Includes Cryptogams.

Rev. W. Moyle Rogers, Journ. Bot., 184, 1910.

ANGLESEY, 52. 176,630 acres.

Flora of Anglesey and Carnarvon, J. E. Griffith, pp. xx + 288, 1895. Maps, Cryptogams and Welsh Names.

Rev. H. Davies, Welsh Botanology, 1813.

Notes, G. C. Druce, Journ. Bot., 181, 1902.

C. E. Salmon and W. G. Travis, Journ. Bot., 316, 1917.

LINCOLNSHIRE, 53 S., 54 N. Natural boundary. 176,193 acres.

No general Flora.

Check List, Rev. E. A. Woodruffe-Peacock, pp. 96, 1909; Notes, do., Journ. Bot. 55, 1898.

S. Lincs., W. H. Beeby, Journ. Bot. 17, 1884.

Gainsborough, T. V. Wollaston, Phyt., 522, 1843.

Sibthorp, ex Druce, Journ. Bot., 257, 1910; 66, 1911.

Outline Flora, F. A. Lees in White's History, Gazetteer and Directory, 1892.

Winterton, Rev. W. Fowler, Phyt., 331, 1857.

LEICESTER AND RUTLAND, 55. Leic. 532,779 acres. Rutland, 97,273 acres.

Flora, F. T. Mott and others, xxvi + 374, 1886. Includes Cryptogams.

Wild Fruits, Trans. Leic. Lit. and Phil. Soc., 1890.

Flora, Mary Kirby, 1850.

Notes, A. B. Jackson, Journ. Bot., 3, 37, 1904; 261, 1906.

Twycross, A. Bloxam, Phyt., 640, 1846; do., List in Naturalist, vol. 2, 79 and 132, 1839.

Adventive Flora, G. J. V. Bemrose, Trans. Leic. Lit. and Phil. Soc., 1927.

Charnwood Forest, C. C. Babington and A. Bloxam, 1842. Includes Cryptogams.

Notes, A. R. Horwood, Journ. Bot., 26, 1904; 430, 1909; 31, 48, 1911.

NOTTINGHAMSHIRE, 56. 540,223 acres.

General Flora in preparation.

Fl. Notts, Thos. Ordoyno, 1807.

Notes, J. W. Carr, Journ. Bot., 134, 1909.

Nottinghamshire Flora, G. Howitt, 1839. 866 species.

Catalogue, C. Deering, 1738.

J. Sidebotham, Phyt., 78, 1841; 365, 1842.

A. R. Horwood, Rep. B.E.C., 296, 1915

Victoria County History, Botany, J. W. Carr, 1904.

DERBYSHIRE, 57. 650,369 acres.

Flora, Rev. W. H. Painter, 156, 1889. 782 species, 107 aliens. Supplement, pp. 105, 1902.

Flora, Rev. W. R. Linton, 458, 1903. Maps, Bibliography and Mosses. 849 species.

W. H. Painter, Journ. Bot., 210, 244, 293, 374, 1881; 178, 1889.

Upland Botany, J. E. Baker, Journ. Bot., 6, 1884.

Matlock, W. M. Hind, Phyt., 609, 1858.

Buxton, Rev. W. Moyle Rogers, Journ. Bot., 76, 1885.

Matlock, J. G. Baker and Rev. W. W. Newbould, Journ. Bot., 334, 1884.

Upland Flora, W. West, pp. 71, 1885.

S. Derby, W. H. Purchas, Journ. Bot., 44, 101, 139, 1887; W. R. Linton, *l.c.*, 329, 1888.

Dovedale, W. M. Hind, Phyt., 537, 1858.

Notes, E. & H. Drabble, Journ. Bot., 199, 1909; 313, 1911; 5, 1913; 133, 1916.

CHESHIRE, 58. 657,950 acres.

Flora, Lord de Tabley (edited by Spencer Moore), cxiv + 399, 1899. Map, Bibliography.

G. C. Druce, Journ. Bot., 354, 1907; 426, 1906.

N. Cheshire, R. S. Adamson, Journ. Bot., 91, 1919.

Early Records, C. E. Salmon, Journ. Bot., 369, 1913.

Doubtful Species, Hon. J. L. Warren, Journ. Bot., 163, 1875.

Plants of Wynbunbury, G. C. Druce, Journ. Bot., 33, 1907.

E. & H. Drabble, Journ. Bot., 152, 1910.

A. Bennett, Journ. Bot., 352, 1899; 129, 1919.

Roses, J. R. Matthews, Journ. Bot., 137, 1920.

LANCASHIRE, 59 S., 60 W. Natural boundary. 1,194,555 acres.

(Lake Lancashire included in 69, Westmorland).

Liverpool Flora, J. B. Hall, 1840.

Liverpool Flora, J. H. Dickinson, 1851, 1859, 1872, with three appendices. 15 miles' radius.

Liverpool District Flora, C. T. Green, xii + 207, 1902; 2nd Ed., xii + 163, 1933. 802 excellent figures.

Kersal Moor, J. Cosmo Melvill, Journ. Bot., 211, 1882.

W. Lancs Flora, J. A. Wheldon and A. Wilson, 511, 1917. Excellent photos, Cryptogams. Additions, Journ. Bot., 22, 1901; 346, 1902; 94, 1905. Lanc. and Ches. Naturalist, 167, 1914; 117, 1925.

W. Lancs, Rev. W. R. Linton, Rep. Bot. Rec. Club, 248, 1874; 341, 1882.

W. Lancs Notes, C. E. Salmon and H. S. Thompson, Journ. Bot., 293, 1902.

Early Lancs and Cheshire Records, C. E. Salmon, Journ. Bot., 369, 1912.

St Anne's, C. Bailey, Trans. Manch. Lit. and Phil. Soc., 41, 1909.

Manchester Flora, J. B. Wood, 1840.
Preston, C. J. Ashfield, Trans. Lanc. and Ches. Hist. Soc., 1858-64.
Silverdale, C. J. Ashfield, Bot. Chron., 73-96, 1864.
Hawes Water, W. H. Pearsall, Rep. B.E.C., 294, 1915.
Southport, A. A. Dallman, Lanc. and Ches. Nat., 1922.
Southport, J. Windsor, Phyt., 417, 1863.
Extinctions, J. A. Wheldon and A. Wilson, Journ. Bot., 336, 1913.

YORKSHIRE, 61 S.E., 62 N.E., 63 S.W., 64 M.W., 65 N.W.

Artificial boundaries. 3,889,432 acres.

Flora, N. Yorks, J. G. Baker, 350, 1863. Bibliography.
Flora, H. Baines, 159, 1840. Suppl., J. G. Baker and J. Nowell, 188, 1851.
Flora of Whitby, B. Reynolds, 63, 1915.
Flora, W. Yorks, F. Arnold Lees, 848, 1888. Maps, Bibliography and Cryptogams.
Flora, W. Yorks, J. W. Davis and F. Arnold Lees, xl + 414, 1878. Map, Plate and Bibliography.
Flora, East Riding, J. Fraser Robinson, 253, 1902. Mosses by J. J. Marshall.
Huddersfield, C. C. B. Hobkirk, in Hist. of Huddersfield, 165, 1859.
Sheffield Brit. Ass. Meeting, 1910, Botany, B. H. Bentley. Fungi by T. Gibbs. Map.
Wakefield, J. Cryer, Nat., 1916.
Bradford, J. Cryer, Rep. B.E.C., 719, 1919.
J. Backhouse, Phyt., 1065, 1089, 1126, 1844.
Castle Howard, H. Ibbotson, Phyt., 577, 781, 1843.
Settle, J. Windsor, Phyt., 145, 173, 259, 348, 1855-56; 12, 423, 1857-58.
Ribblesdale, Phyt., 228, 1864.
Bradford, J. Willis, Journ. Bot., 10, 1874.
Skipton Flora, L. Rotheray, 144, 1900.
Fl. Cravoniensis, J. Windsor, 177, 1873 (ex Phytologist).
Halifax, W. B. Crump and C. Crossland, lxxv + 316, 1904. Bibliography and Cryptogams. 2636 species, including 1105 Fungi. (Suppl. to Halifax Naturalist).

DURHAM, 66. 649,244 acres.

Flora of Durham and Northumberland, N. J. Winch, 1831; Additions, do., 1836.
New Flora of Northumberland and Durham, J. G. Baker and G. Tate, 316, 1868. 1141 species.
Ballast Flora, Winch, Norman and Lawson, Trans. Nat. Hist. Soc. Newcastle.
Stockton, Nat. History of, J. Hogg, Ann. Nat. Hist., 1827.
Ballast Flora, J. Hogg, Journ. Bot., 47, 1867.
Teesdale, J. G. Baker, Phyt., 1048, 1853.

Plants, C. E. Salmon, Journ. Bot., 18, 1914.

Teesdale, C. E. Salmon, Journ. Bot., 137, 1914; do., Rev. E. S. Marshall, *l.c.*, 359, 1918.

NORTHUMBERLAND. Tyneland, 67. Cheviotland, 68. 1,291,515 acres.

No complete Flora.

Botanist's Guide through Northumberland and Durham, N. J. Winch, etc., 112, 1805-7.

Flora, see Durham, N. J. Winch.

Botany of Eastern Borders, G. Johnston, 1853, 2 vols. 935 species in two counties.

Berwick-on-Tweed, G. Johnston, 1829-1831. Cryptogams.

Catcheugh Crag, Phyt., 97, 1861.

Holy Isle, W. Richardson, Phyt., 10, 1863.

Alnwick, History of, G. Tate, 1869.

WESTMORLAND AND N. LANCASHIRE, 69. 504,917 acres.

No general Flora.

High Cup Nick, J. G. & E. G. Baker, Journ. Bot., 299, 1894.

Flora of Lake District, including part of Cumberland and Lake Lancashire, J. G. Baker, vi + 262, 1885.

Lake District Plants, Ley and Linton, Journ. Bot., 171, 216, 1906.

Esthwaite Water, W. H. Pearsall, Journ. of Ecol., 1918.

Furness, W. H. Pearsall, Lanc. and Chesh. Nat., 1914.

Derwentwater, W. H. Pearsall, Rep. B.E.C., 515, 1916.

Notes, W. H. Pearsall, Rep. B.E.C., 290, 1915.

Lake Lancashire, Miss E. Hodgson, Journ. Bot., 268, 296, 1874.

A. Ley and W. R. Linton, Journ Bot., 171, 1906.

Martyn, Plantae Cantab., Westmorland App., 102-5, 1763.

CUMBERLAND, 70.

Flora, W. Hodgson, xxxvi + 398, 1899.

A Flora of the English Lake District, J. G. Baker (see Westmorland), vi + 262, 1885.

Remarks on Flora, N. J. Winch, pp. 266, 1825; Contributions, 1833. Includes Cryptogams.

A. Bennett, Journ. Bot., 225, 1899.

C. E. Salmon, Journ. Bot., 18, 1914.

Gosforth, J. Robson, Phyt., 1, 1854.

Jenkinson's Guide, 1873.

Helvellyn, Phyt., 26, 1854.

G. C. Druce, Journ. Bot., 391, 1902.

E. Green, Phyt., 65, 1861.

ISLE OF MAN, 71. 145,600 acres.

No general Flora.

Catalogue of Plants, S. A. P. Kermode, Yn Lioar Manninagh (Trans. I.O.M. Nat. Hist. and Ant. Soc.), 273, 1900. Additions, G. A. Holt, *l.c.*, 20, 58, 1910.

Rev. H. Stowell, Phyt., 161, 1860.

W. P. Hiern, Journ. Bot., 11, 1897.

J. W. Hartley and J. A. Wheldon, Journ. Bot., 170, 213, 1914.

SCOTLAND, 29,796 square miles.

Scotia Illustrata, R. Sibbald, 1684.

Flora Scotica, J. Lightfoot, 2 vols., pp. 297 and 292, 1777; 2nd ed. 1789. Cryptogams.

Flora Scotica, W. J. Hooker, 1821.

Northern Flora, A. Murray, 1836. Incomplete.

H. C. Watson, New Botanist's Guide, 1835-37.

Scottish Mountain Altitudes, H. T. Munro, Scot. Mt. Club Journal.

Scottish Topographical Botany, Prof. J. W. H. Trail, Ann. Scot. Nat. Hist., 39, 98, 164, 230, 1898; 95, 165, 1899; 32, 103, 1900; 174, 224, 1905; 33, 93, 172, 230, 1906; 44, 1908; 178, 250, 1909.

Scottish Plants and Top. Bot., Trail and Roy, Journ. Bot., 237, 1884.

Highland Plants, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 65, 1897.

E. Scotland, Rev. E. S. Marshall, Journ. Bot., 228, 1893.

N. Scotland, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot.. 166, 1898.

Highland Plants, Rev. E. S. Marshall, Journ. Bot., 149, 1888; 229, 1889; 158, 1916.

Highland Plants, Marshall and Hanbury, Journ. Bot., 165, 1887; 179, 1890; 108, 1891.

The Grampians, G. Neild, Oldham Field Club, 1877.

High Alpine Flora of Britain, F. N. Williams, Ann. Scot. Nat. Hist., 163, 242, 1908; 30, 108, 164, 229, 1909; 34, 1910.

Scottish Rubi, J. W. H. Trail, Ann. Scot. Nat. Hist., 59, 170, 233, 1902; 41, 103, 1903.

Scottish Hieracia, J. W. H. Trail, Ann. Scot. Nat. Hist., 244, 1902.

Scottish Hieracia, G. C. Druce, Ann. Scot. Nat. Hist., 54, 1903; 58, 1906; 103, 1911; Scottish Plants, do., Trans. Bot. Soc., Edin., 147, 1912.

Alien Plants, J. Fraser, Ann. Scot. Nat. Hist., 106, 1904; 100, 1906; 37, 1907; 101, 1908; 40, 1909; 43, 1910.

Perthshire Highlands, Pamplin and Irvine, Phyt., 417, 446, 475, 1855-6.

Scottish Carices, G. C. Druce, Ann. Scot. Nat. Hist., 59, 1906.

Plants of Southern Counties, G. C. Druce, Ann. Scot. Nat. Hist., 39, 95, 1910; 96, 164, 1911.

DUMFRIES-SHIRE, 72. 680,227 acres.

Flora, G. F. Scott-Elliot, xl + 219, 1896. Map, Geology and Insect Visitors. Includes Wigtown and Kirkcudbright. 900 species.
E. F. & W. R. Linton, Journ. Bot., 167, 1890.
P. Gray, Phyt., 416, 1842; 254, 1848.
Rev. W. R. Linton and Rev. E. S. Marshall, Journ. Bot., 212, 1908.
W. Stevens, Phyt., 390, 1848.
W. L. Lindsay, Phyt., 57, 1855.
A. Davidson, Scot. Nat., 32, 1887.

KIRKCUDBRIGHT, 73. 574,588 acres.

See Fl. Dumfries-shire.
G. C. Druce, Rep. Bot. Rec. Club, 64, 1883.
Galloway, J. Fraser, Trans. Dumfries and Galloway N.H. Soc., 1916.
Colvend, P. Gray, Phyt., 348, 1848; 740, 1849.
G. C. Druce, Ann. Scot. Nat. Hist., 96, 164, 1911.

WIGTOWNSHIRE, 74. 310,747 acres.

See Fl. Dumfries-shire.
Flora, G. C. Druce, Rep. Bot. Rec. Club, 65, 1883. 552 species.
G. C. Druce, Ann. Scot. Nat. Hist., 29, 185, 241, 1899.
List, A. C. M'Candlish, pp. 49, 1931.
Aliens, J. Fraser, Rep. B.E.C., 84, 1914.

AYRSHIRE, 75. 793,600 acres.

No general Flora.
Clydesdale and Ayrshire Plants, Rev. W. Moyle Rogers, Journ. Bot., 54, 1902.
W. Whitwell, Journ. Bot., 291, 1898, *Botrychium.*
Ailsa Craig, J. H. Balfour, Phyt., 257, 1845.
Clydesdale Flora, R. Hennedy: see Lanarkshire.

RENFREWSHIRE, 76. 156,785 acres.

No general Flora.
Clydesdale Flora, R. Hennedy: see Lanarkshire.
Adventives, R. Grierson, Rep. B.E.C., 719, 1919; 405, 1921.

LANARKSHIRE, 77. 562,821 acres.

No general Flora.
Clydesdale Flora, R. Hennedy, ed. i, 1865; ed. iv, pp. xxxiv + 250, 1874.
W. of Scotland, Brit. Ass. Meeting, Glasgow, 1928, Botany, D. Patton.
Flora Glottiana, T. Hopkirk, 1813. (Includes Dumbarton, etc.)
Adventives, R. Grierson, Rep. B.E.C., 719, 1919; 405, 1921.

PEEBLES-SHIRE, 78. 226,829 acres.

Flora of Peeblesshire in History of Peeblesshire, vol. 1, chap. x. F. R. S. Balfour, 1925.
Peebles List, G. S. Blackie, Phyt., 221, 1851.
G. C. Druce, Ann. Scot. Nat. Hist., 96, 164, 1911.

SELKIRKSHIRE, 79. 172,549 acres.

No general Flora.
Plants, G. C. Druce, Ann. Scot. Nat. Hist., 39, 95, 1910; 96, 164, 1911.
Adventive Flora of Tweedside (includes Roxburgh and Peebles, etc.), Ida M. Hayward and G. Claridge Druce, xxxii + 296, 1919. Many illustrations.
Aliens, Ida M. Hayward, Trans. Bot. Soc., Edin., 32, 1910.
G. C. Druce, Ann. Scot. Nat. Hist., 96, 164, 1911.

ROXBURGHSHIRE, 80. 422,656 acres.

No general Flora.
G. C. Druce, Ann. Scot. Nat. Hist., 239, 1905.
Liddesdale, J. Elliot, Hist. Berwick Nat. Club, 233, 1897.
St Abb's, R. H. Dunn, Hist. Berwick Nat. Club, 225, 1897.

BERWICKSHIRE, 81. 294,865 acres.

Catalogue, J. V. Thompson, xviii + 125, 1807.
Flora, G. Johnston, 2 vols., 1829-1831. Cryptogams.
A. H. Evans, Hist. Berwick Nat. Club, 217-235, 1917.
G. C. Druce, Ann. Scot. Nat. Hist., 239, 1905.

HADDINGTON, 82. 179,142 acres. (East Lothian.)

Bass Rock, History of, J. H. Balfour, 1848, 1855.
G. C. Druce, Ann. Scot. Nat. Hist., 239, 1905.
Bass Rock, W. Keddie, Phyt., 242, 1845.
Edinburgh Floras have Haddington localities.

EDINBURGH, 83. 231,724 acres. (Midlothian).

Flora, C. O. Sonntag, 1894.
Flora, J. H. Balfour and J. Sadler, 174, 1863. Map. 20-30 mile radius. Many records for neighbouring counties.
Flora Edinensis, R. K. Greville, 1824.
Field-Club Flora of the Lothians, I. H. Martin, viii + 142, 1927. Map.
Aliens, W. & W. E. Evans, Ann. Scot. Nat. Hist., 174, 236, 1904.

LINLITHGOW, 84. 76,807 acres. (West Lothian).

Edinburgh Floras have Linlithgow localities.

FIFE AND KINROSS, 85. Fife, 314,592 acres. Kinross, 46,485 acres.

Rarer Flowering Plants, George Lawson, Phyt., 129, 1848.

Moss Flora, C. Howie, 1889.

STIRLING, 86 (includes Clackmannan). 172,549 acres.

No general Flora.

Notes, Stirling and Kidston, Trans. Stirling Nat. Hist. Soc., 109, 1892-93.

PERTHSHIRE, 87 W., 88 Mid., 89 E. Natural boundaries. 1,617,808 acres.

Flora, F. W. Buchanan White, lix + 407, 1898. Map. Edited by Prof. Trail.

Additions, W. Barclay, Proc. Perth. Soc. Nat. Science, 1912; do., J. R. Matthews, *l.c.*, 185, 1926-27.

Lichens, Wheldon & Wilson, pp. 74. Suppl., Journ. Bot., 1915.

Perthshire Plants and Top. Bot., F. W. Buchanan White, Journ. Bot., 270, 1884.

J. Sim, Phyt., 33, 96, 1859; 132, 1860.

Ben Laoigh (and Argyll), G. C. Druce, Journ. Bot., 9, 1888; do., P. Ewing, *l.c.*, 51, 1889.

Scottish Plants, G. C. Druce, Journ. Bot., 39, 1890.

Breadalbane Mountains, W. Gardiner, Phyt., 468, 1843.

E. F. & W. R. Linton, Journ. Bot., 145, 1892.

Highland Plants, Rev. E. S. Marshall and W. A. Shoolbred, Journ Bot., 164, 1894.

Mid Perth, J. R. Matthews, Journ. Bot., 193, 1913; Rev. E. S. Marshall, *l.c.*, 164, 1914.

Ben Lawers, Anon., Phyt., 29, 1857.

Ben Ledi, Phyt., 376, 1861.

Ben-y-Gloe, Wilson and Wheldon, Journ. Bot., 227, 1914.

G. C. Druce, Ann. Scot. Nat. Hist., 164, 1900.

ANGUS OR FORFARSHIRE, 90. 560,286 acres.

Flora, W. Gardiner, xxiv + 308, 1848. Cryptogams.

G. Don, Flora, Appendix to Headrick's Agricultural Survey, 1813.

Anderson's Guide to Highlands, 1834.

Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 114, 1905.

Rev. E. S. Marshall, Journ. Bot., 211, 1916.

R. Brown, Journ. Bot., 321, 1771.

E. F. & W. R. Linton, Journ. Bot., 167, 1890.

Notes, C. E. Salmon, Journ. Bot., 261, 1918.

Caenlochan, J. Backhouse, Phyt., 441, 1849; 768, 1850; 79, 1851.

G. C. Druce, Ann. Scot. Nat. Hist., 104, 1901.

Glen Doll, etc., J. Barton, Phyt., 588, 1858.

Roses, M. Corstorphine, Rep. B.E.C., 695, 1931.

KINCARDINESHIRE (Mearns), 91. 245,347 acres.

Fl. Abredonensis, G. Dickie, 1838; Botanist's Guide to Aberdeen, Banff and Kincardine, do., 1860.
Ferns, W. Sutherland. Phyt., 333, 1857.
Flora of Aberdeen, P. Macgillivray, 1853.

ABERDEENSHIRE, 92 S., 93 N. Boundary partly artificial. 1,261,521 acres.

The Northern Flora (Kincardine, Banff, Elgin, etc.), A. Murray, 1836.
Fl. Abredonensis, G. Dickie, 1838; do., Botanist's Guide to Aberdeen, Banff and Kincardine, 1860.
E. F. & W. R. Linton, Journ. Bot., 167, 1890.
Flora of Aberdeen, P. Macgillivray, 1853.
Lochnagar, J. B. Brichan, Phyt., 536, 1843.
Braemar, J. Barton, Phyt., 281, 308, 341, 417, 1857-58.
Ferns, W. Sutherland, Phyt., 333, 1857.
S. Aberdeen, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 154, 1906.
S. Aberdeen, G. C. Druce, Ann. Scot. Nat. Hist., 35, 1901.

BANFFSHIRE, 94. 410,112 acres.

Botanist's Guide to Aberdeen, Banff and Kincardine, G. Dickie, 1860.
G. C. Druce, Journ. Bot., 17, 116, 1888; 39, 1890.
Tomintoul, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 154, 1906.
N.E. Highland Plants, Rev. W. Moyle Rogers, Journ. Bot., 12, 1904.
Buchan, J. W. H. Trail, Ann. Scot. Nat. Hist., 164, 1901; 45, 97, 1902.
Aliens, J. W. H. Trail, Ann. Scot. Nat. Hist., 103, 1904.

ELGIN OR MORAY, 95. 304,606 acres.

G. Gordon, Collectanea, 1849.
G. C. Druce, Journ. Bot., 17, 116, 1888; 200, 1889; 39, 1890.
N.E. Highland Plants, Rev. W. Moyle Rogers, Journ. Bot., 12, 1904.
E. Scotland, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 383, 1899.
Aliens, J. W. H. Trail, Ann. Scot. Nat. Hist., 103, 1904.
Vegetation of Culbin Sands, Stewart and Patton, Rep. B.E.C., 253, 1923.

INVERNESS-SHIRE. 96 Easterness. 97 Westerness. S.E. boundary natural. 2,616,545 acres.

Easterness, etc., G. C. Druce, Journ. Bot., 17, 116, 1888; 200, 1889; 39, 1890.
Dalwhinnie, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 164, 1913; Bridge of Brown, Journ. Bot., 154, 1906.
Inverness-shire, Rev. E. S. Marshall, Journ. Bot., 129, 1917.

N.E. Highland Plants, Rev. W. Moyle Rogers, Journ. Bot., 12, 1904.
East Scotland, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 383, 1899.
West Highland Plants, Rev. T. F. Ravenshaw, Phyt., 206, 1857.
Westerness, W. R. & E. F. Linton, Journ. Bot., 371, 1884; W. F. Miller, *l.c.*, 345, 1895; C. E. Salmon, *l.c.*, 271, 1903; G. C. Druce, Ann. Scot. Nat. Hist., 36, 1904; S. M. Macvicar, *l.c.*, 176, 1896.

ARGYLLSHIRE, Mainland 98. 1,990,472 acres.

Dalmally Plants, Rev. E. S. Marshall, Journ. Bot., 191, 1911.
Rev. E. S. Marshall, Journ. Bot., 389, 1901.
Ben Laoigh, G. C. Druce, Journ. Bot., ~~9, 1889~~ 364, [illegible]; D. Patton, Rep. B.E.C., 797, 1922; 268, 1923.
Highland Plants, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 164, 1894.
Lismore, S. M. Macvicar, Ann. Scot. Nat. Hist., 36, 1899.

DUMBARTONSHIRE, 99. 157,289 acres.

Clydesdale Flora, R. Hennedy; see Lanarkshire.
Rev. E. S. Marshall, Journ. Bot. 389, 1901; 158, 1915.
Flora Glottiana, T. Hopkirk, 1813.
Adventives, R. Grierson, Rep. B.E.C., 405, 1921.

CLYDE ISLES, 100. Bute, Arran, Cumbraes. 139,440 acres.

Clydesdale Flora, R. Hennedy; see Lanarkshire.
Arran, J. Bryce, Geol. of other Clyde Isles, ed. 4, 228-251, 1872.

CANTIRE, 101. Peninsula of Kintyre, Mull.

J. H. Balfour, Phyt., 291, 321, 1845. 524 species.
C. E. Salmon, Journ. Bot., 338, 1898; 299, 1900.

SOUTH EBUDES, 102. Islay, 150,000 acres. Jura, 9,300 acres.

Islay, J. H. Balfour, Phyt., 291, 321, 1845. Additions, A. Somerville, Journ. Bot., 433, 1896.
Colonsay, Oronsay, Symington Grieve, Trans. Bot. Soc., Edin., 1881. Includes Mosses.
A. Somerville, Journ. Bot. 433, 1896.

MID EBUDES, 103. Mull, 224,802 acres; Coll, 18,000 acres; Tiree, 18,896 acres.

Tiree, S. M. Macvicar, Ann. Scot. Nat. Hist., 31, 81, 1898.
Tiree & Coll, S. M. Macvicar, Trans. Nat. Hist. Soc., Glasgow, 55, 1896-97.

NORTH EBUDES, 104. Skye, Rum, Eigg, Muck, Canna. 30,000 acres.

Skye, M. A. Lawson (with Fox and Oliver), Journ. Bot., 108, 1869. 389 species.

G. C. Druce, Ann. Scot. Nat. Hist., 96, 164, 1911.

Eigg, S. M. Macvicar, Ann. Scot. Nat. Hist., 34, 110, 1897.

Skye, C. E. Salmon, Journ. Bot., 165, 1916.

W. R. & E. F. Linton, Rep. Bot. Rec. Club, 55, 1884; 207, 1889; 168, 1903.

Skye, W. R. & E. F. Linton, Journ. Bot., 367, 1884.

ROSS-SHIRE, including Cromarty. 105 W., 106 E. Natural boundary. 1,970,004 acres.

Flora, G. C. Druce, Suppl. Rep. B.E.C., xxxviii + 112, 1929. Bibliography, etc.

G. C. Druce, List in Rep. Bot. Rec. Club, 168, 1881.

W. Ross, G. C. Druce, Journ. Bot., 17, 116, 1888; Ann. Scot. Nat. Hist., 166, 1903; Trans. Bot. Soc., Edin., 112, 1894.

Scotch Plants, G. C. Druce, Journ. Bot., 39, 1890.

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East Ross, G. C. Druce, Journ. Bot., 356, 1882; 226, 1903.

Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 383, 1899; 132, 1910.

W. Ross, C. E. Salmon, Journ. Bot., 347, 1897.

N. Scotland, Rev. E. S. Marshall, Journ. Bot., 266, 1901.

W. Ross, A. Bennett, Ann. Scot. Nat. Hist., 107, 1901.

SUTHERLANDSHIRE, 107 E., 108 W. Natural boundary. 1,297,849 acres.

J. Graham, New Phil. Journal, 593, 1828.

E. Sutherland, G. C. Druce, Ann. Scot. Nat. Hist., 37, 122, 1903; 39, 106, 1908.

E. Sutherland, A. Bennett, Ann. Scot. Nat. Hist., 225, 1893; 25, 1894.

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N. Scotland, F. J. Hanbury and Rev. E. S. Marshall, Journ. Bot., 165, 1887.

CAITHNESS, 109. 448,068 acres.

Vegetation, C. B. Crampton, pp. 132, 1911.

R. Dick, Trans. Bot. Soc. Edin., 1854.

Notes, G. C. Druce, Ann. Scot. Nat. Hist., 168, 1904; 39, 106, 1908.
British Assoc. Report, 1885 (abstract).
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J. F. Grant and A. Bennett, Scot. Nat., 305, 357, 1887-88; 39, 77, 1889-90.
A. Bennett, Journ. Bot., 114, 1882; 85, 1885; Trans. Bot. Soc. Edin., 54, 1924; Ann. Scot. Nat. Hist., 247, 1892; 224, 1904; 36, 1905; 225, 1910; 44, 1911; Scot. Bot. Rev., 181, 1912.
Stroma, A. Bennett, Ann. Scot. Nat. Hist., 108, 1900.

HEBRIDES, 110. Harris, 123,757 acres. Lewis, 437,171 acres. N. Uist, 75,431 acres. S. Uist, 90,099 acres.

Balfour and Babington, Ann. and Mag. Nat. Hist., 1841. 311 species.
Barra, A. Somerville, Trans. Nat. Hist. Soc. Glasgow, 32, 1889. 416 species.
St Kilda, R. M. Barrington, Journ. Bot., 213 1886; W. B. Turrill, Rep. B.E.C., 428, 1926; C. P. Petch, Journ. Bot., 169, 1932.
Notes, A. Bennett, Scot. Nat., 191, 1888; Ann. Scot. Nat. Hist., 56, 1892; 240, 1895; 164, 1905; 165, 229, 1910; 185, 186, 1911.
W. A. Shoolbred, Journ. Bot., 237, 1895.
N. Uist, W. A. Shoolbred, Journ. Bot., 478, 1899.
Flannan Isles, J. W. H. Trail. Ann. Scot. Hist., 187, 1905; A. Bennett, *l.c.*, 187, 1907.

ORKNEY ISLES, 111. 240,746 acres. 29 isles inhabited, 38 uninhabited.

Flora Orcadensis, Magnus Spence, xcv + 148, 1914. Maps.
List, W. Irvine Fortescue, Scot. Nat., 318, 362, 1881-82; 26, 72, 110, 1883-84.
Notes, Col. H. H. Johnston, Trans. Bot. Soc. Eidn., 1895, et seq.; Ann. Scot. Nat. Hist., 173, 1895.
N. Scotland, Rev. E. S. Marshall, Journ. Bot., 266, 1901.
A. Bennett, Ann. Scot. Nat. Hist., 169, 1908.

ZETLAND, 112. 352,889 acres.

List, Thomas Edmondston, Ann. and Mag. Nat. Hist., 1841; do., Flora of Shetland, xxvii + 67, 1845.
R. Tate, Journ. Bot., 2, 1866.
Fl. Zetlandica, G. C. Druce, Rep. B.E.C., Suppl., 457, 1921; Additions, Rep. B.E.C., 628, 1924.
Notes, Craig Christie, Trans. Bot. Soc. Edin., vii + 166, 1870, and appendix, 255, 1870.
Flora, C. F. A. Saxby, 1903 (2nd Ed. of Edmondston's Flora).

Additions, W. H. Beeby, Scot. Nat., 20, 1887; 209, 1888; 32, 1889; 212, 1890; 25, 1891; Ann. Scot. Nat. Hist., 51, 1892; 164, 169, 233, 1907; 110, 1908; 103, 1909; Journ. Bot., 267, 1909.

Fair Isle, J. W. H. Trail, Ann. Scot. Nat. Hist., 165, 1906.

Vegetation, W. R. Price, Rep. B.E.C., 770, 1928.

W. West, Journ. Bot., 265, 297, 1912. Includes Lichens.

Foula, W. B. Turrill, Rep. B.E.C., 838, 1928.

IRELAND. 32,059 square miles.

Topographical Divisions, R. Ll. Praeger, Journ. Bot., 57, 1896.

Tourist's Flora of West of Ireland, R. Ll. Praeger, xii+243, 1909. Map.

Flora of Cork, T. Power, 1845.

Cork, Kerry, Dublin, G. C. Druce, Journ. Bot., 304, 1891.

New or Scarce Plants, I. Carroll, Phyt., 76, 1854; 76, 1857.

Ulster Flora, G. Dickie, 1864.

Kerry, R. W. Scully, Journ. Bot., 71, 1888; 85, 1889; 110, 1890; 143, 1891; H. S. Thompson, *l.c.*, 227, 1910.

Killarney, Rev. W. M. Hind, Phyt., 25, 1857.

Flora of Kerry, R. W. Scully, lxxxi + 406, 1916. Map. Species 840, out of 1150 Irish.

West Ireland, E. F. & W. R. Linton, Journ. Bot., 18, 1886.

Irish Plants, Rev. E. S. Marshall and W. A. Shoolbred, Journ. Bot., 250, 1896.

Irish Plants, Rev. E. S. Marshall, Journ. Bot., 496, 1896.

G. C. Druce, Journ. Bot., 307, 1891; 248, 1907, 179, 1899.

Howth Flora, H. C. Hart, 1887.

Aran Isles, Nowers and Wells, Journ. Bot., 180, 1892; N. Colgan, Ir. Nat., 75, 106, 1893.

Flora of N.E. Ireland, S. A. Stewart and T. H. Corry, xxxiii+331, 1888.

L. Ogilby, Phyt., 345, 1845.

Wexford, Rev. E. S. Marshall, Journ. Bot., 46, 1898.

Dingle, Rev. W. M. Hind, Phyt., 97, 1857.

Ben Bulben, R. M. Barrington and R. P. Vowell, Proc. R.I.A., 493, 1885.

Donegal, F. R. Browning, Rep. B.E.C., 426, 1927.

Cybele Hibernica, D. Moore, A. G. More, 1866; 2nd Ed., More, Colgan and Scully, 1898.

Suppl. to Cyb. Hibernica, A. G. More, 1872.

Tyrone, H. C. Hart, Journ. Bot., 327, 1887.

N.W. Donegal, H. C. Hart, Journ. Bot., 77, 106, 143, 183, 1879; 27, 330, 1880.

Flora of Dublin, N. Colgan, lxx + 324, 1904. Map.

Westmeath, E. F. & W. R. Linton, Journ. Bot., 119, 1896.

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BY THE

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REPORT OF THE DISTRIBUTOR FOR 1932.

A FURTHER substantial decrease in the number of plants submitted for exchange reduced the total for the past year to the lowest figure—with one exception—for over 50 years. Nor can it be claimed that the numerical decrease has been compensated for by an increase in the interest of the plants submitted. With the exception of *Rubus* and *Polygonum* most of the critical genera were poorly represented, some. e.g., *Batrachium*, *Centaurea* and *Myosotis* by single gatherings, whilst some, e.g., *Rosa* were entirely lacking.

On the whole the quality of the material submitted was good, and I have to thank members for the observance of those rules which do so much to lighten the task of the Distributor. It is, however, necessary once more to request members to observe the rule, so often stressed by previous Distributors, with regard to the sending in of less than the minimum number of ten sheets of any one gathering. Whilst this rule is still too frequently ignored, it would seem that the desire to comply with it has been met in some cases by a decrease in the number of specimens allocated to each sheet.

It is a pleasure again to acknowledge gratefully the assistance given by the various referees, viz.:—Dr E. Drabble, Rev. H. J. Riddelsdell. Messrs W. C. Barton, C. E. Britton, J. Fraser, W. O. Howarth. C. E. Hubbard, W. H. Pearsall, H. W. Pugsley and A. J. Wilmott. The Report gains in interest and value by the increased number of critical notes which they have contributed. A special word of thanks is due to Dr Drabble for the large amount of time which he has given to the examination of a large number of the plants.

W. ARTHUR SLEDGE.

THE UNIVERSITY,
LEEDS, April 12th, 1933.

LIST OF PARCELS RECEIVED.

	Number of sheets (and packets of seeds).	No. of gatherings.
G. J. V. Bemrose	37	4
C. E. Britton	182	15
G. C. Brown	133	12
R. Bulley	81	8
R. J. Burdon	89	6
J. Chapple	375	22
H. Foster	79	7
J. Fraser	109	5
P. M. Hall	49	3
H. H. Johnston	4	1
J. E. Little	167	11
J. W. Long	82	5
J. E. Lousley	121	11
W. H. Pearsall	116	7
Miss I. M. Roper	58	4
W. A. Sledge	39	4
F. A. Sowter	51	6
National Museum of Wales ...	37	5
E. C. Wallace	212	10
C. Waterfall	226	20
A. Wilson	29	2
Lt.-Col. A. H. Wolley-Dod ...	15	1
Total	2291	169

Thalictrum minus L. Moorland near Berry Head, Brixham, South Devon, v.-c. 3, July 6, 1932.—C. WATERFALL. "Agrees with all of the descriptions in my books. The specimen lacks the base of the stem to show whether it is scaly or leafy to the base."—FRASER. "This is the plant usually called *T. majus* Crantz, so far as I can determine it without fruit. Information concerning the mode of growth whether far-creeping or 'caespitose' (the latter term being here used when a shoot is sent up year after year from the same stock) should be given, the rootstock being thoroughly investigated at the time of collecting, or by cultivation which would also permit of fruits being distributed. It is partly the insufficient material distributed which makes this difficult group so troublesome."—WILMOTT.

Ranunculus sardous Crantz. Cornfield, Great Danegate, E. Sussex, August 23, 1932.—W. H. PEARSALL. "Flowers, fruit and leaves are correct."—FRASER. "*R. sardous* proper of Druce's List, = *R. hirsutus* Curtis, = *R. sardous β hirsutus* (Curt.) of Rouy and Foucaud, *Fl. Fr.*, i.e., the commoner hairy form."—DRABBLE.

Ranunculus peltatus Schrank. Chiddingford, Surrey, June 28, 1932.—R. J. BURDON. "Yes, *R. peltatus*, but untypical through growing in very shallow water."—PEARSALL. "Correct, but the submerged leaves are not well represented, probably due to the water having dried up."—FRASER.

Papaver Rhoeas L. Waste ground in field, Brookfield, near Bovey Tracey, South Devon, v.-c. 3, June 3, 1932.—C. WATERFALL.

Fumaria officinalis L., var. *Wirtgenii* Haussk. Quarry, Barrowden, Rutland, July 1932.—F. A. SOWTER. "This is *F. officinalis* L., var. *elegans* Pugsl. The variety *Wirtgenii* has shorter racemes of more broadly winged flowers and more rotundate fruits."—PUGSLEY.

Fumaria officinalis L., var. *Wirtgenii* Haussk. Det. PUGSLEY. Near Lambridge Wood, Henley, Oxon. July 23. 1932.—J. CHAPPLE.

Barbarea lyrata Asch. Corner of hedge, near Brookfield, Bovey Tracey, South Devon, v.-c. 3, June 6, 1932.—C. WATERFALL.

Arabis hirsuta Scop. Holton stone pits, Oxon, June 1932.—J. CHAPPLE.

Cardamine bulbifera Crantz. High Wood, Hawkenbury, Kent, v.-c. 16, May 16, 1932.—Leg. L. M. CHILD, comm. Tunbridge Wells Municipal Museum, per W. H. PEARSALL.

Erophila verna E. Meyer. var. *leptophylla* Jord. Station yard, Mumby, N. Lincs, v.-c. 54, June 1, 1932.—IDA M. ROPER. "I think this comes under var. *radians* O. E. Schulz as the petals in my specimen seem to be only about 2 mm. in length and the other characters are right, leaves rather large, nearly or quite entire in a conspicuous rosette."—DRABBLE.

Erophila verna (L.) Meyer, var. *cabillonensis* (Jord.) O.E.S. Frilford Golf Course, Berks, May 1929.—Leg. G. C. DRUCE, comm. J. CHAPPLE. "This does not seem to agree very closely with O. E. Schulz's description of this variety. It has much in common with *cabillonensis*, but the fruits are much too small. Dr Schulz thus named specimens from the wall of West Mill, Hitchin, 1916, H. C. Littlebury (see Salmon and Baker, *J. Bot.*, August 1928, p. 236). In 1916 Mr Littlebury sent to the Watson Club plants gathered on April 21 and May 24. The April plants agree closely with the present Frilford specimens, and in my opinion are not *cabillonensis*. It was the May gathering that was named *cabillonensis* by Dr Schulz and these seem to be altogether different from the April set. Possibly confusion of the two gatherings may have led Dr Druce so to name the Frilford plants. My specimens do not agree with any of O. E. Schulz's varieties described in Salmon and Baker's paper The fruits closely resemble in outline those of var. *oedocarpa* but are larger, and it is not easy to determine if they were terete when fresh, whilst the whole plant is much larger in stem and leaf. For an unfortunate error in the description of *oedocarpa* in Salmon and Baker's paper, the blame must rest on me. The width of the fruits should be given as 1.25-1.5 mm. not 2.25-2.5 mm. The latter measurements were given accidentally in *J. Bot.*, 1926, and were copied by Salmon and Baker. It is only fair to say that proofs of this paper, which appeared during Dr Rendle's absence from this country, were never sent to me."—DRABBLE.

Sisymbrium Loeselii L. Cultivated, Newport, Isle of Wight, August 1929; found at Newport in 1928.—J. W. LONG. "Yes."—DRABBLE and WILMOTT.

Brassica juncea Coss. [Ref. No. 4039.] Merton, Surrey, September 4, 1932. Casual. All examples taken from one large plant. *B. juncea* Coss. is a plant cultivated over a considerable area in the warmer regions of the globe for the purpose of extraction of oil from the seeds. Druce (*Adv. Fl. Tweedside*) states that it is allied to *B. nigra* L., but Otto Kunze more rightly was of the opinion that it is related to *B. arvensis* Scheele, of which he regarded it as a subglabrous tropical cultivated variety. The surface of the seeds is regularly reticulate-alveolate.—C. E. BRITTON. "Correctly named. Practically glabrous, rather glaucous; upper leaves oblong, subentire, tapering to the base, not clasping. Lower leaves lyrate. Pedicels slender and spreading; pods about 3.5 cm. long, with slender seedless beak. It would be interesting to ascertain when this Asiatic alien was first recorded for Britain. It was introduced into U.S.A. at the beginning of this century and is already quite common. It is not recorded for France by either Rouy or Coste, but is given for Sweden in Lindman, *Svensk Fanerogamflora*, 1918, 283."—PEARSALL. "Yes."—DRABBLE.

Capsella Bursa-pastoris (L.) *Druceana* Almq. Merton, Surrey, May 1918. Various localities and dates. Members may like to possess examples of this minor species commemorative of our late Secretary. The special interest of these specimens is that Dr Almquist had them before him when he drew up the description of *C. b.-p.* (L.) *Druceana* published in the *Acta Horti Bergiana*, Band 7, No. 2 (1921). He wrote that he had examples from Oxford [G. C. Druce], and from Surrey [C. E. Britton], and had cultivated many examples from England.—C. E. Britton. "Correct; recognisable by the deep apical sinus, and the long rounded lateral lobes of the fruit; also the little-divided leaves. The fruits of my specimen are unusually large."—Fraser.

Coronopus didymus Sm. Edge of cindery path, the recreation ground, Torquay, South Devon, June 6, 1932—C. Waterfall. "In the early seventies of last century this was chiefly confined to the South and West of England, now it is frequent in the East."—Fraser.

Lepidium Draba L., var. *subintegrifolium* Mich. Near Lambridge Wood, Henley, Oxon, July 23, 1932.—J. Chapple. "I agree. The leaves are nearly entire and smaller than those of the type, which is widely spread in three continents. It comes from Persia."—Fraser. "Yes; a well-marked leaf-form."—Drabble.

Helianthemum polifolium Mill. Brean Down, N. Somerset, June 11, 1932. Since I first saw this lovely plant on Brean Down, in 1911, it has considerably extended its range on the headland and is now extremely abundant.—H. Foster.

Viola monticola Jord. [Ref. No. 851]. Det. Drabble. Near Horndean, S. Hants, v.-c. 11, October 16, 1932. Growing in great abundance among young clover sown under an oat crop, but only in one field of several sown with the same mixture of clover seeds. From the appearance of many of the plants, they seem to have flowered in the corn earlier in the year, died down and made second flowering growth after the corn was cut, at the same time forming basal shoots for the continuance of the plant next year.—P. M. Hall. "All these sheets are excellent *monticola* Jord."—Drabble. "A very interesting and pretty species which gives me the impression of being perennial, as it is in bloom for the second time and may have seen three summers, flowering in the second and third. The barren shoots at the base look good for flowering again."—Fraser.

Viola ——. [Ref. No. 853]. Near Horndean, S. Hants, v.-c. 11, October 16, 1932. Found growing among turnips in an adjoining part of the same field as *monticola* [Ref. No. 851]. No plants of this type were seen growing in the clover with the main growth of *monticola* but a few specimens of *monticola* were seen among the turnips. These plants show the basal branches with rounded leaves of *monticola*, but are "small-flowered" and have a distinct habit, forming circular mats of branches at first spreading along the ground and then becoming erect. A few of the dried specimens may not show the basal branches, as the plants were very large and had to be pulled apart.—P. M. Hall. "As these plants were growing in the neighbourhood of typical *monticola* I can only suggest that they are hybrids between that species and an *arvensis*-pansy. Clausen has proved that small-flower is epistatic in such crosses. The long spreading basal branches suggest *agrestis* as the *arvensis*-parent. This suggestion is tentative only; I should not dare to make it had I not Mr Hall's note."—Drabble.

Viola ——. [Ref. No. D.22]. Near Manor Farm, Sundridge, West Kent, September 18, 1932. Several pansy species were growing here in hopeless confusion, almost every plant varying in greater or less degree from its neighbours. The present gathering was carefully selected from the exact spot where it was originally discovered by Mr A. H. Carter in August 1932, where the plants were favoured by moist and slightly shaded conditions. On the higher exposed ground the same species gradually merged into a plant resembling typical *variata*.—J. E. Lousley. "Most of these are excellent specimens of *V. Lloydii*, var. *insignis*, a few of them are apparently starved plants with smaller leaves, and these approach *V. Lejeunei* in habit, but I think the gathering is homogeneous."—Drabble.

Viola arvensis Murray, var. *agrestis* (Jord.). Waste ground in field, near Brookfield, Bovey Tracey, South Devon, v.-c. 3, June 3, 1932.—C. Waterfall. "These are merely scraps, but they seem to be rather hairy *V. segetalis* Jord. Whole plants must be sent if determination is to be secure."—Drabble.

Viola arvatica Jord. Field near Parkhurst, Lurgashall, W. Sussex, August 23, 1932.—Leg. J. E. Little, comm. R. J. Burdon. "*Viola arvatica* Jord., but some of the specimens do not show the characteristic divaricate peduncles satisfactorily."—Drabble.

Viola ——. [Ref. No. D.21]. Thetford Heath, very near to the Norfolk boundary, West Suffolk, May 15, 1932. Apparently similar to the plant distributed by Mr Little from Santon Warren; see *Watson B.E.C. Rep.*, iii, p. 467 (1928-9).—J. E. Lousley. "The well-known *V. Curtisii*, f. *Pesneaui* of Thetford Heath. Some of the complete specimens show the characteristic twiggy subterranean branches."—Drabble.

Dianthus caesius Sm. Cheddar rocks, N. Somerset, June 16, 1932. I begged these specimens from a villager and was assured by him that the plant is still plentiful on both sides of the Gorge, but in situations rather difficult of access.—H. Foster.

Dianthus Armeria L. Seeds. Origin Cookham, Berks, Hort. Maidenhead, August 3, 1932.—Leg. M. Gardner, comm. J. E. Little.

Cerastium arvense L. Shacklewell Hollow, Rutland, June 1932.—F. A. Sowter.

Arenaria serpyllifolia L., var. *viscidula* Roth. Avonmouth Dock, Bristol, W. Gloster, v.-c. 34, July 4, 1932. All the specimens taken from one plant which measured 16 × 15 in. in diameter.—Ida M. Roper. "All parts of the plant are densely covered with short hairs, curved downward on stems and peduncles, but there are very few glandular hairs, and what I can see are only on the calyx. Possibly I have only got the type."—Fraser. "Some of the branches on my sheet possess a few glands on the calyces, the rest are eglandular. If all the pieces came from one plant it should perhaps be called var. *scabra* Fenzl with occasionally slightly glandular calyces, rather than var. *viscidula* Roth, which is typically densely glandular on calyces, pedicels and often quite low down on the stems. The possibility of such slightly glandular plants being of hybrid origin should not be overlooked."—Drabble.

Claytonia sibirica L. Clayton, Staffs, June 1932.—G. J. V. Bemrose. "This is *C. alsinoides* Sims (*C. sibirica* auct. non L.). The Linnean plant is in the Linnean herbarium, and is not the present plant but one of the species which occurs in Sibiria."—Wilmott.

Hypericum montanum L., var. *scabrum* Koch. Near Lambridge Wood, Henley, Oxon, July 23, 1932.—J. Chapple. "Correct; it seems more common than the type."—Fraser. "The leaves are slightly but distinctly scaberulous, so this plant may be called var. *scabrum* Koch (=var. *scaberrulum* Beck.). I have similar plants from Llandudno and from St Vincent's Rocks. Is this not the commoner form in England?"—Drabble.

Hypericum dubium × *perforatum*. Gravelly field near Burgh Heath, Surrey, August 9, 1932. See *Rep. W.B.E.C.*, 1930-31. The plants now contributed are from another part of the same field—E. C. Wallace. "This set appears quite homogeneous except that in a few examples a proportion of the sepals are unusually narrow and acute. The plant may be of the hybrid origin suggested, but it is very near to ordinary *H. dubium*, and seems to agree with *H. quadrangulum* L., var. *punctatum* Schinz *Fl. Schweiz* (Kritische), p. 154 (1905), which is characterised by its pellucid-punctate foliage. The forms referred to *H. Desetangsii* Lamotte have distinctly narrower and more acute sepals than any of these specimens, as have also my artificially raised hybrids *H. dubium* × *perforatum*."—Pugsley. "These specimens seem to be similar to those previously sent to the Watson Club (see *Rep. W.B.E.C.*, 1930-31, pp. 63-64). I there called the plant *H. Desetangsii* Lamotte, while admitting the possible hybrid origin suggested by Mr Wallace. The frequently acute sepals, the many transparent glands on the leaves and the obsolescent or obsolete intermediate ridges on the stem all point to *Desetangsii*, and I still think it may be correctly so named. Mr

Pugsley in the same Report, p. 64, called the plant *H. dubium* × *perforatum* and suggested that *Desetangsii* may consist of forms of this cross. I always hesitate to suggest hybridity without very strong evidence, but Mr Pugsley thinks that this hybrid, which he has raised artificially, may probably appear frequently in nature (*loc. cit.*, p. 64). Certainly the name *Desetangsii* has been used to cover a rather wide range of variation, and it is quite possible that it covers this hybrid and also *H. dubium*, var. *punctatum* Schinz, which name Mr Pugsley now suggests for the Burgh Heath plant. I have not seen authenticated specimens of var. *punctatum* Schinz, but if the acute sepals and poorly developed or obsolete intermediate ridges on the stem be characters of this variety, in addition to the " punctate " leaves, this name may very well be used, though its adoption would, of course, leave the origin of that plant still uncertain."—DRABBLE. " The leaves of the branches are larger than those collected in 1929, and seem a little nearer *H. dubium* Leers; but the very irregular sepals show both parents."—FRASER. " This appears to fall under *H. Desetangsii* in the broad sense, *i.e.*, when that rather unsatisfactory " species " is made to include several supposed hybrids. It is worth noting that Rouy mentions a poverty of seed production in two of the species of this group, whereas both *H. Desetangsii* (*sensu stricto*) and Mr Wallace's 1929 plant from the same locality have abundant fully formed capsules. It would be interesting to know whether any other species of *Hypericum* besides *perforatum* occurred in the immediate vicinity."—LOUSLEY.

Althaea officinalis L. Origin, Brightlingsea saltmarshes, N. Essex, v.-c. 19. Cult., Colchester, 1931-1932.—G. C. BROWN.

Geranium versicolor L. Roadside, Matfield, Kent, September 3, 1932.—W. H. PEARSALL. " Yes."—DRABBLE and FRASER.

Geranium Endressi Gay. [Ref. No. 4032]. Oxted, Surrey, August 15, 1932.—C. E. BRITTON. " This is not *G. Endressi* Gay, which has sub-entire petals and a different leaf-cutting. I should have called it *G. striatum* L."—WILMOTT. " This certainly does not agree with Coste's description of *G. Endressi*. The purple colouration is suffused through the petals and not limited to the veins, but otherwise it does not seem to differ from Mr Pearsall's plant."—SLEDGE.

Geranium pyrenaicum Burm. Waste ground, Mid. Rly., Lenton, Nottingham, July 17, 1932.—R. BULLEY. " Yes."—FRASER.

Ulex europaeus L. Seedlings. Heathy ground, Papplewick, Notts, August 23, 1930.—R. BULLEY.

Medicago denticulata Willd., var. *confinis* Burnat. Waste ground by maltings, Hythe Quay, Colchester, N. Essex, v.-c. 19, August 16, 1932.—G. C. BROWN. " Correct; except that Burnat is not the correct authority to cite for that combination. The name should be written

M. hispida Gaertn., var. *confinis* (Koch) Burnat."—WILMOTT and DRABBLE. "This differs from var. *apiculata* (Willd.) by the spines being almost completely absent."—FRASER.

Lotus siliquosus L. Plentiful and long-established on waste ground, Mersea Island, N. Essex, v.-c. 19, August 19, 1932.—Coll. J. P. BROWN, comm. G. C. BROWN. "The flowers of this puzzled me greatly, because all of those I received were heavily tinged with purple, and some of the pods had been injured in drying, making the wings appear undulated. This change of colour often occurs in *Lotus corniculatus* L. and *Medicago sylvestris* Fr. I agree to the name *Lotus siliquosus* L., or *Tetragonolobus siliquosus* Roth."—FRASER. "Yes."—DRABBLE.

Coronilla varia L. Waste ground, Lenton, Nottingham, August 6, 1932.—R. BULLEY. "Correct. One of the few cultivated species that has other than yellow flowers."—FRASER.

Vicia lutea L. London Clay cliffs, St Osyth, N. Essex, v.-c. 19, June 12, 1932.—G. C. BROWN. "The right plant. Pods would have been valuable, if collected later."—FRASER.

Vicia angustifolia L., var. *segetalis* Koch. Waste ground in field near Brookfield, Bovey Tracey, South Devon, v.-c. 3, June 3, 1932.—C. WATERFALL. "Not the variety of Koch (*Syn. Fl. Germ.*, 197, 1836), but *V. sativa* L. as described there."—WILMOTT. "The material is without fully formed fruits, but I think this should come under *sativa*."—DRABBLE.

Spiraea Ulmaria L., var. *denudata* Boenn. Castle Eden Dene, County Durham, July 25, 1932.—R. J. BURDON. "Correctly named. Sometimes the leaves are only partly denuded beneath."—FRASER. "Good examples of this form with stem-leaves green and nearly glabrous beneath, which has been described by several authors. Its instability is easily observed in the field, and is also evidenced by Beck and Rouy finding it necessary to make further varieties in order to cover intermediates found. The question as to whether a varietal name was justified or not was fully discussed by Horwood (*Journ. Bot.*, 1904, p. 308; and 1911, p. 16), and Druce (*Journ. Bot.*, 1910, p. 281), and in view of Yapp's careful work on the ecology of the plant (*Ann. Bot.*, v, p. 815, July 1912), the varietal name should obviously be abandoned. A character so dependent on shade, moisture and seasonal periodicity is useless for taxonomic purposes."—LOUSLEY. "*S. Ulmaria*, var. *denudata* Presl, pro sp. The veins are downy as in Presl's description in *Fl. Cachica*. The editors of Bab., ed. 9, quote Boenninghausen as the authority and describe the leaves as "glabrous on the under surface." This matter is dealt with elsewhere in this Report."—DRABBLE.

Spiraea Filipendula L. Moorland near Berry Head, Brixham, South Devon, v.-c. 3, July 6, 1932.—C. WATERFALL.

Rubus nessensis W. Hall (*R. suberectus* Rogers). [Ref. No. 2488.] Swampy heathland, Middlewick Rifle Ranges, E. Donyland, N. Essex, v.-c. 19, June 19 and July 13, 1932. Petals white, sepals patent in flower reflexed later, stamens equalling or shorter than styles, leaves pale green and shining.—G. C. BROWN. "This is *R. suberectus* Anderss. Hall's *nessensis* may be the same, but there is nothing in his description to exclude *fissus*."—BARTON and RIDDELSDELL.

Rubus Rogersii Linton. Det. WATSON. Greenham Common, Berks, June 1931.—Coll. G. C. DRUCE, comm. J. CHAPPLE. "This is a mistake. *R. Rogersii* has quite different leaves (clothing and shape) and a narrower, leaflier and more prickly panicle. Some of Druce's stempieces are mutilated and useless, and the gathering is not free from suspicion of mixture. It may be a form of *plicatus*, as Rogers apparently thought, but that suggestion is not without difficulty."—BARTON and RIDDELSDELL.

Rubus imbricatus Host.? [Ref. No. 2487.] Middlewick Rifle Ranges, E. Donyland, N. Essex, v.-c. 19, July 13, 1932. Petals white, sepals loosely reflexed in flower and later, stamens exceeding styles. Not extreme, but I think undoubtedly *imbricatus*, which is abundant on this heathland.—G. C. BROWN. "This is neither *imbricatus* nor its var. *londinensis* Rog.; it lies between the two, showing characters of both. Some of the pieces are mildewed."—BARTON and RIDDELSDELL.

Rubus polyanthemus Neum., b. *pulcherrimus* Neum.? [Ref. No. 2486.] "The Bush," Great Bromley, N. Essex, v.-c. 19, July 14, 1932. Petals pink, sepals reflexed in flower and later, stamens slightly exceeding styles. Apparently a neat, small form of *pulcherrimus* gathered rather too young.—G. C. BROWN. "Taking the gathering as a whole, we think it is a somewhat aberrant form of *R. polyanthemus* Lindeb. = *pulcherrimus* Neum."—BARTON and RIDDELSDELL.

Rubus macrophyllus Wh. & N.? [Ref. No. 2485.] Wood, Markshall Deer Park, N. Essex, v.-c. 19, July 17, 1932. Petals pale pink, sepals patent in flower loosely reflexed later, stamens much exceeding styles.—G. C. BROWN. "No; this is a form of *R. dumnoniensis* Bab. emend. Rog."—BARTON and RIDDELSDELL.

Rubus fuscus Weihe. [Ref. No. C.6.] Det. WATSON. Hailey, Oxon, July 8, 1932.—J. CHAPPLE. "Probably a robust form under *fuscus*, but showing certain features in stem, leaves and panicle in which it differs from W. & N.'s plant."—BARTON and RIDDELSDELL.

Rubus dasyphyllus Rogers. [Ref. No. 2484.] Middlewick Ranges, E. Donyland, N. Essex, v.-c. 19, July 17, 1932. Petals pinkish, sepals patent in flower reflexed later, stamens slightly exceeding styles.—G. C. BROWN. "Correct; a homogeneous gathering."—BARTON and RIDDELSDELL.

Rubus tereticaulis Rogers. [Ref. No. C.13.] Boar's Hill, Berks, August 10, 1932. Named for me by Mr Watson, who remarks on it as follows:—"The glaucous stem is a very striking feature of the growing plant and is unaccountably passed over in silence in the Handbook description. I have studied the plant on Row Hill, N.W. Kent (N.C.R.), and have it growing here. It is worth noting that at Mousehold Heath, where it also occurs in Norfolk, it is accompanied by *Rubus hirtifolius* P.J.M., as at Boar's Hill. It is possibly the Boar's Hill Bramble given in *Fl. Berks*, p. 180, as *R. Scaber*."—J. CHAPPLE. "The name *tereticaulis* cannot be applied to this plant which is the Boar's Hill '*Scaber*,' a name suggested for it by Focke. The stem leaves now distributed are none too good, but we have several sheets of it from Boar's Hill, where it is abundant. For the present it seems best to keep to the familiar name."—BARTON and RIDDELSDELL.

Rubus corylifolius Sm., var. *conjungens* Bab. [Ref. No. C.4.] Det. WATSON. Wooton, Berks, July 7, 1932.—J. CHAPPLE. "Very near *conjungens*, though not exactly it. It may be suitably left under this head."—BARTON and RIDDELSDELL.

Rubus caesius × *ulmifolius*. [Ref. No. C.5.] Det. WATSON. Woodeaton, Oxon, July 19, 1932.—J. CHAPPLE. "There is no sign of *ulmifolius* here, as far as we can see, though it is perhaps not pure *caesius*."—BARTON and RIDDELSDELL.

Potentilla erecta × *procumbens*. (× *P. fallax* Zimmet). [Ref. No. D.23]. With putative parents, Mitcham Common, Surrey, August 17, 1932. The occasionally sessile upper leaves with divided stipules are evidence of *erecta*, while the sprawling habit, long-stalked lower leaves, and the form of the epicalyx indicate *procumbens*.—J. E. LOUSLEY. "I think the plant on my sheet is a large form of *P. erecta* Hampe. If there is any hybridity here no doubt *procumbens* was the other parent but I see very little suggestion of it. Were these plants noticeably different from *erecta* in that locality?"—DRABBLE. "I see no signs of *P. procumbens* Sibth. in this. Why is it not *P. erecta* (L.) Hampe?"—WILMOTT. "*P. erecta* Hampe. I cannot see the influence of *P. procumbens* Sibth. in the specimens received."—BRITTON.

Sedum rupestre L. (1) Cheddar Gorge, N. Somerset, June 23, 1932. Very plentiful at all levels on the cliffs, accompanied low down by *Hieracium lima*. (2) Also from Weston, N. Somerset, June 30, 1932. Much larger and coarser than the Cheddar Gorge *S. rupestre*, and flowers later.—H. FOSTER. "Correct, but the leaves have mostly dropped, and the barren rosettes had not been formed in June. The old cauline leaves would have held on better if boiling water had been poured over them before being dried."—FRASER. "Single specimens hardly constitute sheets for exchange purposes."—ED.

Epilobium tetragonum L. Waste ground, Beeston, Notts, August 13, 1932.—R. Bulley. "Evidently this species, though some of the leaves are not so strictly opposite as they should be."—Fraser. "Yes; *E. tetragonum* L."—Drabble.

Epilobium Lamyi F. Schultz. Cult., Kew, from Beaconsfield, Bucks, July 27 and October 2, 1932, the latter date for the autumnal rosettes. —J. Fraser. "Yes; *E. Lamyi* Schultz."—Drabble.

Epilobium Lamyi F. Schultz. Waste ground near the University, Leeds, August 3, 1932. Buds erect, stigmas clavate, entire; stoles late autumnal, dense, rosulate.—W. A. Sledge. "The most striking feature of these specimens is the length of the petioles. With the other characters I find no fault."—Fraser. "*E. Lamyi* Schultz, with flowers rather paler and fruits shorter than usual, otherwise very typical. Very interesting material."—Drabble.

Epilobium lanceolatum Seb. & Maur. [Ref. No. 982]. Lane near Brook, Surrey, August 9, 1932. Leg. R. J. Burdon and J. E. Little, comm. R. J. Burdon. "Correct as far as the material goes."—Fraser. "There are no flowers on my specimen and so I cannot examine the stigma, but it appears to be *lanceolatum*."—Drabble.

Conium maculatum L. Hedge banks near Compton Castle, Marldon, South Devon, v.-c. 3, July 29, 1932.—C. Waterfall.

Bupleurum falcatum L. Essex, various collectors and dates.—National Museum of Wales, per A. E. Wade.

Bupleurum tenuissimum L. On the edge of the sea wall, Burnham on Crouch, S. Essex, September 19, 1932.—E. C. Wallace.

Apium nodiflorum H. G. Reichb. Ditch near Compton Castle, Marldon, South Devon, v.-c. 3, July 20, 1932.—C. Waterfall.

Meum Athamanticum Jacq. Castley pastures, Howgill, near Sedbergh, North-West Yorks, v.-c. 65, July 6, 1932.—W. A. Sledge. "Yes; fine specimens."—Fraser.

Galium Mollugo L. Hedge banks near Durl Head, Brixham, South Devon, v.-c. 3, July 6, 1932.—C. Waterfall. "A not unusual form of the species and coming under var. *typicum* Beck = var. *genuinum* H. Braun. Chiefly distinguished by the elongated oblong acute leaves, whereas in var. *elatum* (Thuill.) the leaves are shorter, broader, and more rounded at the apex."—Britton.

Galium erectum Huds. Thrumpton Hills, Notts, July 2, 1932.—R. Bulley. "I agree."—Fraser. "Correct, a rather small form."—Britton.

Valerianella olitoria Poll. Waste ground in field, Brookfield, Bovey Tracey, South Devon, v.-c. 3, June 3, 1932.—C. WATERFALL. "Rightly named."—FRASER.

Aster paniculatus Lam.? Waste ground, Armley, Leeds, W. Yorks, October 27, 1932. A garden outcast which has firmly established itself during the last three years.—H. FOSTER.

Gnaphalium luteo-album L. Cultivated, Newport, Isle of Wight, August and October 1932.—J. W. LONG.

Ambrosia artemisiaefolia L. Sand dunes, Hoylake, Cheshire, August 1932.—G. J. V. BEMROSE.

Cotula coronopifolia L. Ditches near lighthouse, Leastowe, Wirral Peninsula, Cheshire, v.-c. 58, August 22, 1908.—Leg. CHARLES BAILEY, comm. NATIONAL MUSEUM OF WALES, per A. E. WADE. "Correct. Has been collected many times at Leastowe, Wirral."—FRASER.

Senecio ——. [Ref. No. 4057]. Llanegryn, Merioneth, July 31, 1931. Gathered too early, before the plants had developed their mature characters, but considered at the time to be possibly *Senecio erraticus* Bert.—C. E. BRITTON. "Ref. No. 4057 a = *Senecio aquaticus* Hill, var. *pennatifidus* Grenier & Godron. Ref. No. 4057 b = *S. aquaticus* Hill, var. *intermedius* Druce. I have grown the latter "variety" from fruits given me by Dr Druce. It is undoubtedly more than a mere growth state. The forms of *S. aquaticus*, namely *genuinus* G. & G., *pennatifidus* G. & G., and *intermedius* Druce form a series leading to *S. erraticus* Bert., which I think should also be included in *aquaticus*." —DRABBLE.

Cirsium arvense Scop., var. *obtusilobum* Beck. [Ref. No. 4012]. West Barnes, Merton, Surrey, July 23, 1932. Beck (*Fl. N.Ö.* ii. 2. p. 1239) divided this species into three varieties, *obtusilobum* being distinguished by the usually pinnatifid leaves having the apex and the lateral lobes obtuse and spinose-cuspidate. As the leaves of the plant distributed are green beneath, and the lobes are broad and again divided, it comes under the forma *subruderale* Beck.—C. E. BRITTON. "This certainly agrees well with the description of *obtusilobum* in Beck's *Flora Nieder Öesterr.*, but we have not seen specimens named by Beck."—WILMOTT and DRABBLE.

Cirsium arvense Scop., var. *integrifolium* W. Grab. Abundant by Postford Ponds, Albury, Surrey, August 14, 1932. By Salmon's arrangement in *Flora of Surrey* one could name this var. *setosus* M. Bieb. f. *integrifolium* Koch. Most of the flower heads have been rendered abortive by the attack of a moth larva, one in each head.—E. C. WALLACE. "A very interesting gathering and separated into sheets of uniform value. The specimens are remarkable for the oblong-lanceolate, entire leaf-blades margined with small appressed prickles, and for the long-peduncled anthodes. The varietal name, which has been well chosen by the collector, is thus defined by Wimmer & Grabowski, *Flora Silesiae*, vol. 2, part 2, p. 82 (1827), " foliis omnibus planis, obovato-lanceolatis integerrimis margine setoso-spinosis subtus nudis." The authority for the name is sometimes given as Koch, who, however, modified the characters to include plants with slightly toothed leaves. By many botanists the variety is considered synonymous with *Cirsium setosum* Marschall v. Bieberstein, but, as that plant was described by the author as possessing sinuate-pinnatifid lower leaves, it would seem better to keep the two forms apart. *Cnicus setosus* Besser (*Catal. hort. cremenc.* (1816) p. 39), the description of which I have not seen, is also cited as a synonym, and I have no doubt that most collectors would label this plant as *Cirsium arvense*, var. *setosum* (Bess.), but, whether they would be correct in doing so, appears to me to be uncertain. C. E. Salmon in his *Flora of Surrey* has an interesting note on the Surrey forms of *Cirsium arvense*. He has a var. *setosus* M. Bieb. including the two forms (a) *integrifolius* Koch with entire leaves, and (b) *complanatus* Schweigg., with subundulate, sinuate, dentate leaves. The second name is unknown to me elsewhere, and I can only suppose it to be a *lapsus calamus* for *Serratula complicata* Schweigg., a plant with somewhat lobed leaves placed under var. *integrifolius* by Koch. Mr Wallace's plant must, I think, be a rare form. There is nothing like it among the forms of *Cirsium arvense* contained in the British Herbarium at the Natural History Museum at South Kensington, and but few similar plants among the Continental forms."—BRITTON. " This is *C. setosum* Bieberst., of which *integrifolium* is the form with entire leaves."—DRABBLE. " This is *C. setosum* (Willd.) M.B., an alien species distinct, in my opinion, from *C. arvense* Scop. The entire and lobed leaf forms are scarcely worth varietal names, and the varietal name is of Wimm. & Grab. (not W. Grab., as it has been copied from Beck)."—WILMOTT. " The most reduced form of leaf I have seen in this species, there being only small, erect prickles close to the edge of the leaf. Even the var. *setosum* has a few shallow lobes."—FRASER. " *Cnicus arvensis* Hoffm., var. *setosus* M. Bieb., f. *integrifolius* (Wimm. & Grab.) Salmon. A most interesting plant, doubtless introduced as is probably always the case with forms of var. *setosus*."—LOUSLEY.

Centaurea ——. Castle Eden Dene, County Durham, August 2, 1932.—R. J. BURDON. " *C. obscura* Jord. The gathering comprises examples fairly uniform in habit and characteristic of *C. obscura*."—BRITTON.

Crepis biennis L. Fruits. Matfield, Kent, v.-c. 16, July 1, 1932.—W. H. PEARSALL. "The characters are right for *C. biennis*."—FRASER. " Yes, *C. biennis*; very useful fruiting heads. These ought always to be sent with specimens of *Crepis*, as they are quite necessary for secure determination. The heads should be dried without pressure and placed in an envelope."—DRABBLE.

Crepis setosa Haller f. [Ref. No. 4013.] Cannon Hill, Merton, Surrey, July 24, 1932.—C. E. BRITTON. "Yes. Heads with ripe fruits would have added greatly to the value of these specimens; those on my sheet are too young to show clearly the nature of the receptacle."—DRABBLE.

Hieracium Pilosella L., *genuinum*, teste ZAHN. Andoversford, E. Gloster, July 1929.—Leg. G. C. DRUCE, comm. J. CHAPPLE.

Hieracium grandidens Dahlst. [Ref. No. 3969.] Pilgrim's Way, Caterham, Surrey, June 28, 1932. Abundant and very showy in one limited area. This appears to be the locality mentioned under the name of "White Hill" in the *Fl. Surrey*.—C. E. BRITTON. "This is the plant usually so named in Britain."—PUGSLEY.

Hieracium acuminatum Jord. [Ref. No. 4008.] Worm's Heath, Surrey, July 21, 1932. Similar plants gathered by myself were identified as this species by the late Rev. J. Roffey some years ago prior to the publication of the 11th ed. of the *London Catalogue*, but, from some unknown cause, this species was omitted from the list referred to. More recently *H. acuminatum* Jord. was put on record as a British plant by Dr Druce in *Rep. B.E.C.*, 1930, p. 271. The plants distributed are very similar to the specimens of this species issued by Sudre in his Herb. Hieraciorum, of which No. 79, fasc. ii, differs in the more pointed leaves. No. 121, fasc. iii, is a more luxuriant plant, with the outer root-leaves obtuse or subacute, but with the inner basal leaves resembling those of the Worm's Heath plant, which almost matches an example of *H. acuminatum* from Déséglise's herbarium. My plants have noticeably long-stalked rosette-leaves, probably due to place of growth, i.e., amongst long grass and in thickets. There is a curious discrepancy in the descriptions of *H. acuminatum* Jord. as given by Boreau and Rouy. The former (*Fl. Centr.*, ed. 3, ii, p. 396) wrote that the black glandular hairs of the pericline were almost as long as the width of the phyllary. This statement becomes transformed by Rouy (*Fl. Fr.*, ix, p. 355) into an assertion that the black glandular hairs almost equal the phyllaries in length!—C. E. BRITTON. "I do not know *H. acuminatum* Jord. It is placed by Rouy under *H. vulgatum* Fr., but these plants appear to belong to the group of *H. rigidum* Hartm."—PUGSLEY.

Hieracium pauci̇foliatum Jord. Rly. banks, Cinderhill, June 21, 1930. See *Rep. B.E.C.*, 1931, p. 656.—R. BULLEY.

Hieracium amplexicaule L. Old Walls, Oxford, July 10, 1932.—J. CHAPPLE. "This is *H. amplexicaule* L., which is apparently scarcer in Britain than *H. pulmonarioides* Vill., a plant with which it was formerly confused. The two species were first distinguished as British (naturalised) plants in my paper in *Journ. Bot.*, lviii, p. 281 (1920), and can be readily separated by the hairclothing of *H. amplexicaule* being wholly viscid-glandular, while in its ally, simple, pilose hairs predominate on the stem and petioles."—Pugsley.

Hieracium scabrescens Dahlst. Det. Zahn. Hampstead Marshall, Berks, June 1931. See *Rep. B.E.C.*, 1931, p. 656.—Leg. G. C. Druce, comm. J. Chapple. "This plant has much larger heads than most of the British forms referred to *H. scabrescens* Dahlst.—Pugsley.

Hypochaeris glabra L. var. ?. Cultivated, Newport, Isle of Wight, 1928-1932. Found originally in a light sandy field, now gone out of cultivation, between Newchurch and Alverstone, I.O.W. Its fruits are both beaked and without beaks. It comes up as a weed in my garden and is always much taller and more robust than similar plants from other sources cultivated side by side with it. This difference is even more striking in the case of *H. Balbisii* grown from the seed of a Pwllheli plant found by me in 1927.—J. W. Long. "A gigantic form of *H. glabra* L., var. *genuina* Godr. I have had a very large form of *H. glabra* on loose and freshly-turned sandy soil at Freshwater which I have grown in the garden for four years from seed. It became smaller each year and more like the ordinary small plant that grows on Headon Hill. Mr Long's plants repeat their great size year after year."—Drabble. "The outer fruits have no beak, but the inner ones have a long beak, which makes this the type."—Fraser. "A large form of cultivated ground of (a) *genuina* Godr."—Lousley.

Sonchus palustris L. Kent and Oxford, various collectors and dates.—National Museum of Wales, per A. E. Wade.

Sonchus asper Hill. Achenes. [Ref. No. 981.] Hitchin, Herts, September 1932.—J. E. Little.

Sonchus oleraceus L. Achenes. [Ref. No. 980]. Hitchin, Herts, September 1932. In collecting in quantity the achenes of *S. oleraceus* and *S. asper*, the variations of leaf-form proved most perplexing, and half a dozen times I found that I had gathered in mixture. The fruits have been sorted out, and I hope there is none now, but members are asked to examine for themselves. There is a good figure of the fruit of *S. asper* in Butcher and Strudwick's *Further Illustrations.* The drawing of the achene of the same in Coste's Flora is misleading.

Comparison of the achenes of *Sonchus asper* Hill and *S. oleraceus* L.

	S. asper.	*S. oleraceus.*
Form.	Compressed, slightly oblanceolate.	Less compressed, oblong-oblanceolate, relatively narrower.
Length.	About 2.5 mm.	About 3.0 mm.
Breadth.	About 1.0 mm.	About 1.0 mm.
Margin.	Ribbed, with slight downward directed scabridity near the base.	Slightly blunter, ribbed, with the same scabridity.
Faces.	One median and one lateral rib on either side of the median, prominent.	One median flanked on either side by lateral ribs which are furrowed or doubled.

Rugosity.	None.	Transverse wrinkles on ribs and intercostal spaces.
Colour.	Pale brown.	Slightly darker brown.

There is therefore a permanent difference in form and rugosity and the structure of the two lateral-median ribs.—J. E. LITTLE.

Menyanthes trifoliata L. Bog at Newbridge, Dartmoor, South Devon, v.-c. 3, June 8, 1932.—C. WATERFALL.

Myosotis versicolor Sm., sub-var. *dubia* Rouy. Newhall Wood, Rutland, June 1932. Passed by Mr A. E. Wade.—F. A. SOWTER. "Nicely prepared specimens of sub-var. *dubia* (Arrondeau) Rouy showing clearly that the flowers are white when they first open."—LOUSLEY.

Echium vulgare L. Saunton Sand hills, near Braunton, North Devon, v.-c. 4, July 13, 1932.—C. WATERFALL.

Linaria Elatine Mill. Garden weed, Matfield, Kent, v.-c. 16, August 12, 1932.—W. H. PEARSALL. "Rightly named."—FRASER.

Veronica scutellata L., var. *villosa* Schumacher. Margin of pond on Bisley Common, Surrey, July 24, 1932. Often found with the glabrous plant, which was however absent by this pond.—E. C. WALLACE. "Yes; beautiful material. The villosity is unusually dense for British plants." —DRABBLE. "I agree."—FRASER. "Well marked specimens of the variety which is fairly frequent in the southern counties. The late C. E. Salmon wrote 'This noticeable variety has linear-lanceolate subdenticulate leaves which, as well as the stems, are villous' (*Fl. Surrey*, p. 493), but in the examination of a series I am unable to find any difference in leaf-shape correlated with villosity."—LOUSLEY.

Veronica persica Poir. [Ref. No. 993]. Nine Springs, Great Wymondley, Herts, October 1932. This set is from the same field as [990]. The autumnal leaf development is more pronounced, and the upper leaves are somewhat larger, but it is difficult to draw any clear line between the two sets.—J. E. LITTLE. "My sheet has three good specimens of var. *Kochiana* and one small plant of var. *Aschersoniana*."—DRABBLE.

Veronica persica Poir., var. *Corrensiana* (Lehm.). [Ref. No. 989]. Wymondley Road, Hitchin, Herts, September, October 1932.—J. E. LITTLE. "Yes; large specimens of var. *Corrensiana*, with the characteristic double serration of the leaves."—DRABBLE. "This var. certainly, an account of which appears in the *Journ. Bot.*, 1928, p. 42."—BRITTON.

Veronica persica Poir., var. *Kochiana* Godr. [Ref. No. 990.] Nine Springs, Great Wymondley, Herts, October 1932.—J. E. LITTLE. "Yes, var. *Kochiana*."—DRABBLE. "This does not exhibit the characters of the variety, which, as is stated in my note in the *Journ. Bot.*, 1928, p.

43, is probably only a state distinguished by the slender stems, long filiform pedicels and small leaves with few and shallow serrations."—BRITTON.

Veronica agrestis L., var. *micrantha* Drabble. [Ref. No. 994.] Allotments, White Hill, Hitchin, Herts, November 16, 1932.—J. E. LITTLE. "These plants cannot be named var. *micrantha*. They are smaller than those on my sheet of the same gathering sent through the Watson Club, but they are much more robust and have much larger capsules than in *micrantha*. The corolla when spread open measures about 7 mm. in diameter. *Micrantha* is a small delicate ephemeral variety with corollas only about 3 mm. in diameter when spread open, and these rarely or never open naturally, but fall at an early stage. *Micrantha* seems to be a good variety as it was grown for several years in garden soil and reproduced its distinctive characters year after year. I fear I must be held responsible for Mr Little's labelling. Further examination of the plants has led me to reject them as var. *micrantha*."—DRABBLE.

Euphrasia brevipila Burn. and Gremli. [Ref. No. 967.] Iona Is., Argyllshire, June 28, 1932.—Leg. K. D. LITTLE, comm. J. E. LITTLE. "Yes."—DRABBLE. "Correctly named, I think. Texture of leaves extremely thin and transparent. Short glandular hairs of very variable length and unequal distribution, more or less plentiful on surfaces and margins of the foliage. They are also present on most of the stems, in some cases in quantity."—PEARSALL. "Yes; varying in glandular development but otherwise typical."—PUGSLEY.

Euphrasia brevipila, var. *glabrescens*. Jedburgh, Roxburghshire, July 14, 1932.—R. J. BURDON. "A mixed gathering. The small glandular plants are what Mr Pugsley has named *E. brevipila*, f. *gracilior*. The larger eglandular ones are what we used to call '*E. curta*, var. *glabrescens*,' perhaps better regarded as an unusually hairy form of *nemorosa*."—DRABBLE. "On the eighteen sheets of this mixed gathering there are 62 glandular and 100 eglandular plants. The majority of the former are small, simple or very slightly branched, slender young plants often having one to three pairs of very short branches above the middle of the stem. Their flowers are small, none exceeding 5 mm., and their capsules usually under that length. They show copious short glandular hairs on calyx, bracts and sometimes also on the stem. Somewhat similar plants were distributed by Preb. Burdon from the same locality in 1921. Those I considered *E. brevipila*, and so I should name these small and glandular plants. Most of the eglandular plants are large and robust with coarse foliage very ciliate on the margins. A prominent feature of most of them is the large size and *nemorosa*-like form of the reflexed pairs of nodal leaves. These larger and mostly eglandular plants are *E. nemorosa* in my judgment, although among them are a few plants with glandular hairs, not unusual in this species."—PEARSALL.

"I have never heard of this variety before, but probably f. *gracilior* Pugsl. is intended, for Mr Burdon collected this plant at Jedburgh in 1921. The specimens now sent are not uniform; a very few appear to be *E. brevipila*, f. *gracilior*, but the majority show something of the habit of *E. nemorosa* and though usually setose, are generally eglandular. They are fruiting irregularly and seem to be a hybrid strain *E. brevipila*, f. *gracilior* × *E. nemorosa*. I have not noted this latter species for Roxburgh, but it is probably to be found there for it grows in the adjacent counties."—PUGSLEY.

Euphrasia ——. Sledmere, E. Yorks wolds, September 13, 1932.—R. BULLEY. "Apparently a weak form of *E. nemorosa*."—PUGSLEY.

Bartsia alpina L. Plentiful by a small stream in, or near, the old locality (known to Ray) near Orton, Westmorland, at 870 ft., July 9, 1932. Some members may like to have specimens from this station. I regret that they are rather spoilt through my not having proper facilities for drying."—A. WILSON.

Melampyrum pratense L., var. ——. Sphagnum bog, Wybunbury Moss, Cheshire, September 1932.—G. J. V. BEMROSE. "This appears to belong to the restricted *M. pratense* L. and to be identical with the plant from the same locality that has been referred to var. *paludosum* Gaud., sub-var. *eu-paludosum* Beauv."—BRITTON. "This is the var. *paludosum*, sub-var. *eu-paludosum* of Beauverd's Monograph (1916, p. 490) although similar specimens were also passed as *ericetorum* in the same work (p. 493)."—WILMOTT.

Mentha ——. Stream side between Dinas Powis and Wenvoe, Glamorgan, v.-c. 41, September 14, 1932.—Coll. S. DEWAR, comm. NATIONAL MUSEUM OF WALES, per A. E. WADE. "(1) *Mentha piperita* L. The typical form of the species with lanceolate leaves tapering to both ends, and having a long, stout, spike-like inflorescence. (2) *M. piperita* L., var. *subcordata* Fraser. A broader-leaved variety than the type, having the leaves rounded, truncate or subcordate at the base, not cuneate as in Sole's *M. piperita vulgaris*. The spike is shorter than in the type, and sometimes subcapitate."—FRASER.

Mentha gentilis L. [Ref. No. 4036.] Broadham Green, Surrey, August 15, 1932. Very abundant about a small water-course the site of which is marked out by the purplish foliage of this mint. The locality is one recorded in the *Fl. Surrey*.—C. E. BRITTON. "The whole gathering is correctly named. The inflorescence is well developed and the cilia on the calyx teeth are remarkably well developed but the tube and the pedicels are free from hairs. They are not always so in this and some other hybrids."—FRASER.

Mentha arvensis L., f. *hirtipes* Fraser. Det. FRASER. Ascott under Wychwood, Oxon, July 1930.—Leg. G. C. DRUCE, comm. J. CHAPPLE.

" This looks large for a *M. arvensis* form but it is correct by the length of the calyx teeth. There are many larger plants of this species, when growing in water or shade. All the gathering is uniform."—FRASER.

Teucrium Botrys L. Near Addington, Surrey, August 27, 1932. Probably the same station as reported by W. Borrer, *Phyt.*, iv, p. 1095, 1853. This year more abundant than usual, and as the field has now become difficult of access owing to use as a " sun-bathers' " camp, these few specimens are sent as vouchers for the plants' continued existence there. —LOUSLEY.

Plantago indica L. Waste ground, Stoke-on-Trent, Staffs, September 1932.—G. J. V. BEMROSE.

Chenopodium rubrum L. Byfield Reservoir, Northants, August 1929. —Leg. G. C. DRUCE, comm. J. CHAPPLE. " This appears to come under the unstable form *pseudo-botryoides* Syme, which is frequent by ponds, reservoirs, etc. I have a sheet of the form in my herbarium gathered by A. O. Hume near Exceat Bridge, Sussex, and another sheet indistinguishable from the usual form of farmyards, etc., said to be grown from seed of the same gathering in garden soil."—LOUSLEY. " *Chenopodium rubrum* L., var. *pseudo-botryoides* Syme."—DRABBLE, FRASER, WALLACE, SLEDGE.

Chenopodium opulifolium Schrad. Waste ground, Penarth Road, Cardiff, Glamorgan, v.-c. 41, September 1932.—Leg. A. E. WADE, comm. NATIONAL MUSEUM OF WALES, per A. E. WADE. " Yes, *C. opulifolium* Schrad."—DRABBLE.

Chenopodium opulifolium Schader. var. *mucronulatum* G. Beck. Waste ground, Cheam, Surrey, October 1, 1932.—E. C. WALLACE. "Yes, *C. opulifolium*; my sheet is var. *mucronulatum* G. Beck. Very useful fruiting material."—DRABBLE. " In one edition of Babington this form is described as the type, but that is wrong since most of the teeth of the leaves are mucronulate."—FRASER.

Chenopodium hircinum Schrad. River-side below Newport, Isle of Wight, September and October 1932. About a dozen plants appeared on waste land by the Medina early in the summer. There was a noticeable difference in leaf-form and mealiness, but the objectionable odour was common to all. Several very large plants survived until mid-November and had fruited abundantly.—J. W. LONG. " Yes, *C. hircinum* Schrad. Mr Long showed me this plant in its fresh state; its characteristic odour was very strong and unmistakable. *C. hircinum* varies considerably in leaf-form, as was pointed out by Druce and Hayward in *Adventive Flora of Tweedside*, p. 197."—DRABBLE.

Polygonum amphibium L., var. *glandulosum* Schönheit. [Ref. No. 4587]. Marsh on site of a small pool of water three inches deep on June

24, 1926, which since then has been drained. Maebeck, Papa Westray, Orkney, August 29, 1932. Common in marsh; stem and both surfaces of leaves copiously clothed with short crimson-tipped hairs. Perianth crimson-pink.—H. H. JOHNSTON. "Yes, beautiful material of this well-marked variety."—DRABBLE. "Correct, an additional locality for this interesting form."—BRITTON.

Polygonum Persicaria L. [Ref. No. 4030]. Westend Common, Esher, Surrey, August 14, 1932. A pretty form of ascending habit with narrow leaves and white flowers. Not a hybrid, I think.—C. E. BRITTON. "Yes, the pale, almost white-flowered form."—DRABBLE.

Polygonum Persicaria L., f. *albiflora*. [Ref. No. 2489]. Beside wood, Copford, N. Essex, v.-c. 19, October 25, 1931. Flowers white and simulating *P. lapathifolium*, but seems to have all other characters of normal *Persicaria*.—G. C. BROWN. "The not uncommon pale-flowered form of *P. Persicaria*. The name f. *albiflora* is hardly applicable to my specimen, as there is a distinct pink colour in the perianth."—DRABBLE. "Rather poor specimens which already appear to possess a distinctive name, as they agree fairly well with the description of var. *agreste* Meisn. in DC. *Prodr.*, xiv, p. 118. I have seen this variety in plenty in sandy fields in Surrey."—BRITTON. "This should be labelled 'f. *floribus albis*,' and not '*albiflora*,' i.e., with a description and not an epithet (so-called 'name'), for if an epithet it would have to be '*albiflorum*,' and legitimately published."—WILMOTT.

Polygonum Persicaria L., var. *elatum* Gr. & Godr. Clattercote Reservoir, Oxon, August 1929.—Leg. G. C. DRUCE, comm. J. CHAPPLE. "If, with the *Camb. Brit. Fl.* we divide *P. Persicaria* into (a) *elatum*, (b) *agreste*, (c) *ruderale*, this plant would no doubt come under *elatum*, but I do not at present feel confident that *elatum* and *agreste* are more than the merest growth-states."—DRABBLE. "A weak form that does not show the characters of var. *elatum* Gren. & Godr."—BRITTON. "I have seen specimens passed like these, but the racemes of flowers can be much more slender."—FRASER. "Why *elatum*? My sheet may be quite exceptional but it bears only two weak and slender plants, 12 in. and 13 in. high respectively. The leaves are small and very sparsely hairy. The ocreae are closely adherent with sparingly hairy surfaces and fringed with fairly long cilia. All pedicels examined were quite glabrous, although frequently otherwise in this species. The perianths were frequently glandular near the base."—PEARSALL.

Polygonum lapathifolium L. [Ref. No. 4045]. Lower Morden, Surrey, September 11, 1932. See note in *Report*. Most modern authors agree in describing the fruits of this species as roundish, lenticular and biconcave. However, during the early autumn of 1932 a colony of *P. lapathifolium* L. was encountered at Lower Morden, Surrey, that exhibited the disconcerting feature of producing trilobed fruits in addition to those of the usual flattened form. These unusual fruits were very similar to the trilobed fruits that are produced abundantly by *P. Persicaria* L., but any other feature recalling this last species was absent, and there appeared little likelihood of the plants being of hybrid origin. Dimorphism in the fruits of this species appears to be unknown to most authors. Indeed, of modern writers Hegi (*Illustr. Fl. v. Mitt.-europa*) is the only author known to me who mentions the occurrence of two forms of fruit. He says " nut as a rule lenticular (very seldom triangular)." Schinz and Keller, *Fl. Schweiz*, are less definite, as their description is " fruits (almost) all lenticular, biconcave." As far as I have been able to ascertain, it was William Curtis in the *Flora Londinensis* who first described the production of two forms of fruit in *P. lapathifolium* L. In describing *P. Pensylvanicum* [*lapathifolium*], Curtis wrote, " in the *Persicaria* the seeds [fruits] are either triangular or of a pointed oval shape, with a little *convexity* on each side; in this species it is in general flat with a *depression* on each side; it is also larger and broader; now and then a seed [fruit] occurs forming an unequal triangle, but these are very rare, whilst the triangular seed [fruit] is most frequent in the *Polygonum Persicaria*." The fruits, which would be more correctly described as tri-lobed, are represented on t. 24 of the *Flora Londinensis*, figs. 11 and 12. Trilobed fruits may be found amongst those of the more usual shape produced by the plants [4045] distributed.—C. E. Britton. " Yes, *P. lapathifolium*, with peduncles, pedicels and perianths very glandular. The leaves are arachnoid-felted below and hairy on the midrib, but with varying numbers of glands. The lower surfaces of the upper and young leaves are very glandular but in the lower leaves glands are sparse or absent on my specimen. The nuts are black, shining, concave on both faces and nearly orbicular, slightly smaller than usual, circa 2.5 × 2.0 mm. The perianth is subequal. Many similar plants have been referred to the so-called varieties *tomentosum* (Schrank) Beck or *incanum* Koch."—Pearsall. " Leaves glabrous, peduncles and perianth well glanded, fruits normal; good *P. lapathifolium*. The perianth is also pink as mentioned in *Rep. W.B.E.C.*, 1932."—Fraser.

Polygonum lapathifolium L., var. *genuinum* Gren. & Godr. Farmyard near Crowhurst, Surrey, September 10, 1932. Upright luxuriant growth, with many species of Chenopodium.—E. C. Wallace. " Not var. *genuinum* Gren. & Godr. which is a form with greenish flowers (not greenish-red as in these specimens), larger and broader fruits, and leaves normally ovate- or oval-lanceolate. The plant distributed, with its erect stem and lanceolate-acuminate leaves simulates *P. nodosum* Pers., var. *erectum* Rouy, but, as the fruits clearly indicate, does not come under that species. The lower stem leaves are invested beneath with an arachnoid tomentum which is not, however, sufficiently developed to bring this form under var. *tomentosum* Beck. I refer Mr Wallace's plant to var. *angustifolium* Peterm., *Fl. Lips.* (1838) p. 292. I have similar examples from Surrey. A point of interest attaching to the plant contributed by Mr Wallace is that, among the usual lenticular fruits, a few may be discovered which are tri-lobed in exactly the same manner as is mentioned in my note on *P. lapathifolium* [Ref. No. 4045] from Lower Morden."—BRITTON.

Polygonum lapathifolium L., var. *ruderale* Schuster. [Ref. No. 3844.] Merton, Surrey, August 16, 1931. Also [Ref. No. 4047] from New Malden, Surrey, September 17, 1932. This is a decumbent form of *P. lapathifolium* L. found by waysides, waste places and field borders. It recalls at times *P. nodosum* Pers., and occasionally examples may be recognised in old collections under the name of *P. maculatum* Trim. & Dyer. A description of this variety appears elsewhere.—C. E. BRITTON. "The leaves of this are smaller and the glands on the lower side much more prominent than in the specimen from Lower Morden. The peduncle is also much less glandular and the perianth green."—FRASER. "A smaller plant than 4045 and corresponds to the parallel form *P. Persicaria*, var. *ruderale* Meisner, and from a similar cause—a dry habitat. The peduncles and perianths are very glandular but the articulate pedicels are very slender and only very slightly, or not at all, glandular. The leaves are much smaller than those of 4045, very glandular below, but not felted. The nerves both below and (more sparsely) above, are hairy. The fruits, examined *in situ*, appear much more tapering above than those of the type (4045), but this is due to the fact that the perianths slightly exceed the rather smaller nuts (2.0 × 1.5-1.75 mm.) which are also slightly less orbicular."—PEARSALL.

Polygonum nodosum Pers., var. *incrassatum* Rouy, forma. [Ref. No. 3898A.] Hort. West Barnes, New Malden, Surrey, September 4, 1932. Cultivated examples of a stout-growing form that is distinguished by its comparatively narrow leaves, a feature which is retained in cultivation. Although the lamina tends to become somewhat broader than in the wild plants, the general outline is retained. In most other forms of *P. nodosum* the lamina is broadest towards the base. Here it is not so, and the leaf-blade is more parallel-sided.—C. E. BRITTON. "The leaves of this are quite different from those of the plant formerly known as *P. maculatum* Trim. & Dyer. and *P. petecticale* (Stokes) Dr. The var. *incrassatum* has small seeds, a small perianth and glabrous leaves." —FRASER. "*P. lapathifolium* and *P. nodosum* vars. We are not satisfied that this difficult group is yet properly understood and prefer to see Mr Britton's notes before commenting on his identifications."—WILMOTT and DRABBLE.

Polygonum minus Huds. Binsey Common, Oxon, August 1929.—Leg. G. C. DRUCE, comm. J. CHAPPLE. "Yes, *P. minus* Huds."—DRABBLE. "Correct: var. *commune* A. Br. = var. *subcontiguum* Meisn."—BRITTON.

Polygonum calcatum Lindm. [Ref. No. D.16.] West End Common, Esher, Surrey, October 9, 1932. See Lindman *Bot. Not.*, p. 139 (1904).

and *Svensk Bot. Tidskrift*, iv, p. 690 (1912). Plants from this locality were distributed by Mr C. E. Britton in 1921 as *P. aequale* Lindm., and in 1923 specimens of apparently the same gathering were determined by Danser as *P. calcatum* Lindm. (*Rep. B.E.C.*, 1923, p. 209), under which name the station appears in the *Flora of Surrey*. The present gathering was made in the presence of Mr Britton, who agreed that they were from exactly the same locality and superficially similar to his 1921 specimens, but that as he had never fully satisfied himself as to the differences between his plant and *aequale* he was unable to say whether my gathering was identical or not. In view of Mr Britton's remarks I made a careful examination of the specimens I took from this locality, and feel confident that they come under *calcatum*. The fruit in my gathering is very different from that of normal *aequale*, being much smaller and lanceolate with a gradually attenuated apex and convex sides when mature. The differences in size between normal fruits of the three group species is very marked, *heterophyllum* being the largest, *aequale* little more than half the size, and *calcatum* smaller still, besides which there are the well-known differences in shape. The plants contributed are homophyllous, closely appressed to the ground in habit, with small lanceolate leaves mostly of a peculiar grey-green colour. In these characters they seem typical *calcatum*. However the perigonium is more deeply cleft than is illustrated, occasionally reddish (typically it should be white and green), and in the few fresh flowers I was able to dissect there were about eight stamens, which is three more than type. It is noteworthy that these characters of the perigonium and stamens are not stressed by Lindman in later work (*Svensk Fanerogamflora*, p. 240, (1926)) and (except for the stamens which I am unable to count in dried material) in these and all other characters there is a close agreement with specimens from Sweden in my herbarium (Stockholm, 5/8/1926, leg. Erik Asplund). Apart from the natural plasticity of the group, it is evident that hybrids are frequent, and the presence of the other two species probably accounts for the difficulty in making an entirely homogeneous gathering. Growing with *calcatum* were plants with much rounder, more crowded leaves and shrunken fruits which I have little hesitation in calling *P. aequale* × *calcatum*. That *aequale* and *calcatum* are very closely related, far more so than *aequale* and *heterophyllum*, appears to me exceedingly probable, and future authors may prefer to arrange *calcatum* as a sub-species of the former. I have also identical specimens of *calcatum* from the sandy margin of a similar pond on Weston Green (14/9/29) which is about two miles distant, and more doubtful specimens from Smithwood Common near Cranleigh (E. C. Wallace, 18/9/32).—J. E. Lousley. "I think not *calcatum*, but *P. microspermum* Jord., which seems to be a form of *aequale*."—Drabble. "Not *P. calcatum* Lindm., but the plant generally called *P. microspermum* Jord. This would come under Lindman's *P. aequale*, but it appears to be a distinct form widely spread in Surrey, having been distributed from Weybridge (Watson, 1861, as *P. aviculare*, var. γ), Mitcham Common (Bennett, 1881, as *microspermum* Jord.) and New Malden

(Britton, 1911, No. 447, as *P. microspermum* Jord.). It is also in *Herb. Mus. Brit.* from Kent (Sea Salter, 1894; Marshall, No. 1366) and Alderney (A. B. Jackson, 1932, No. 142), and other specimens with slightly broader leaves may also prove to belong here. I should prefer to treat all these distinct forms as sub-species of *P. aviculare* L."—WILMOTT.

Polygonum cuspidatum Sieb. & Zucc. Waste ground in West's sand pit, Newton by Chester, v.-c. 58, September 1932.—C. WATERFALL. "Correct."—FRASER.

Fagopyrum Fagopyrum (L.). (*esculentum* Moench). Waste ground, Wootton, Berks, July 1932.—J. CHAPPLE. "Correct; the perianth is not accrescent, so that the fruit is fully exposed."—FRASER.

Rumex Patientia L. Fruits. [Ref. No. 983]. Near Gas Works, Hitchin, Herts, August 30, 1932. Has persisted since 1921.—J. E. LITTLE.

Rumex palustris Sm. Fruits. Wretton Fen, W. Norfolk, September 22, 1927.—J. E. Little.

Rumex Acetosella L. Wood near Bovey Potteries, Bovey Tracey, South Devon, v.-c. 3, June 8, 1932.—C. WATERFALL.

Euphorbia exigua L., var. Mayfield, E. Sussex, October 23, 1932. I have labelled the specimens "var." but perhaps they are a state only. The plants were characterised by their immense size, each forming a tuft up to 18 inches in diameter and 7-8 inches high. The distinctive appearance due to their size is lost in the dried specimens. I have been able to make nearly 40 sheets mostly from one specimen. A peculiar feature is the very broad base of the leaves, which is often more or less prominently lobed on the anterior side, as may often be seen in the floral bracts. They were growing in an old pasture whence the turf had been recently removed, and were associated with *Linaria Elatine* and *spuria*, both very uncommon in the neighbourhood. Had their seeds been carried from afar by birds and found here a suitable and rich soil for their germination?—A. H. WOLLEY-DOD. "At least two of the varieties of this are named from the leaves, but I have got no leaves, nor even the bracts of the umbel. What I have got is a very large branch of the infloresence, which is bifurcate six times, giving sixty-four branches finally. It is an erratic infloresecence, with pairs of bracts throughout. *E. exigua* and *E. Peplus* sometimes behave in this erratic way."—FRASER. "This seems fairly typical except in size, which however scarcely exceeds the limit (25 cms.) given by Hegi. The seeds are brownish-black as described by him and show no trace of the usual grey bloom. The seed colour clearly requires investigation: 'gris cendre' (Rouy); 'pitchy-black, tinged with ashy-white' (Syme); and both these are present in a collection (in *Herb. Mus. Brit.*) labelled as coming from one large plant."—WILMOTT and DRABBLE. "I cannot match this with any of the described varieties. Is it anything more than a late autumnal form?"—LOUSLEY. "The specimen received consists of a portion of what was evidently a very large inflorescence exhibiting repeatedly forking axes accompanied by the subtending bracts, which present unusual features as they are partly connate below, with two free margins lobed at the base. The indicated size of the inflorescence and the abnormal development of the bracts point to luxuriant growth rather than to the characters of a true variety. It is noteworthy that no assimilatory leaves are present on the specimen. In the herbarium of the South London Botanical Institute is a similar portion of a large inflorescence of *E. exigua* showing the diffuse habit, with lobed bracts partly connate, that characterise Lt.-Col. Wolley-Dod's plant. The specimen referred to was collected by C. E. Salmon at Reigate Hill, Surrey in 1897."—BRITTON.

Parietaria ramiflora Moench. Garden wall, Stoke Gabriel, South Devon, v.-c. 3, June 29, 1932.—C. WATERFALL.

Salix purpurea × *viminalis* (*S. rubra* Huds. ♂). Thames banks, Kew, Surrey, March 30, 1931, and September 25, 1932. This is one of three named varieties of the hybrid which I have.—J. FRASER.

Salix atrocinerea × *aurita*. Whyteleafe, Caterham Valley, Surrey, April 15 and August 12, 1924. Ref. No. as the labels. *S. atrocinerea* Brot. with red hairs is a native of Spain, Portugal and the British Isles. *S. cinerea* L. with grey-white pubescence and tomentum is not native in the British Isles. Ref. No. 579. I am not sure whether or not I have distributed this hybrid previously. I have been watching a small bush since 1925, and if any one has got this Ref. No. under any other name, please correct it.—J. FRASER.

Salix atrocinerea × *nigricans*. Cult., Kew, from Sedbergh, N.-W. Yorks, v.-c. 65, April 19 and July 22, 1931. Dr Floderus, of Stockholm, has restored *S. nigricans* Sm., for which *S. Andersoniana* Sm. was used by the late Rev. E. F. Linton in his *Monograph of the British Willows* (1913). Only the young leaves are blackened in drying, so that the *S. nigricans* parent could not have been pure; it seldom is where it grows in company with *S. phylicifolia*. Doubtless the parentage is *S. atrocinerea* × *phylicifolia* × *nigricans*. As the bush gets stronger, the leaves get longer, recalling *S. atrocinerea* in shape. The pubescence on the year old stem, *i.e.*, on the flowering shoots, is that of *S. atrocinerea*. The blackening of the bracts and young leaves, and some discolouration of the mature leaves indicate *S. nigricans*. *S. phylicifolia* suggests its presence by the leathery texture of the leaves, their light green colour when growing, and some polish on the year old wood both of the wild and cultivated plant. Dr Floderus wrote the name *S.* (*atrocinerea*) *nigricans*, thus indicating a doubt about the presence of *S. atrocinerea*, and making no mention of *S. phylicifolia*, which appeals to me by many characters, including the glaucous under surface and rapid glabrescence of the young leaves.—J. FRASER.

Salix phylicifolia L. Thornthwaite Crag, High Street range, Westmorland, July 11, 1932. Several shrubs about 4 ft. high on rock ledges at 2100-2250 ft.—A. WILSON. "The purest and most typical form of the species I have seen for a long time. Not only are the tips of the leaves entire, but the whole leaf is sparsely denticulate or subentire, and glabrous except for a few hairs on the youngest leaves at the tip of some of the shoots. The latter are also glabrous. Where this species and *S. nigricans* grow together, they are seldom free from hybridisation."—FRASER.

Orchis Fuchsii Druce. [Ref. No. 2483]. London Clay cliffs, Walton-on-Naze, N. Essex, v.-c. 19, June 26, 1932. Leaves mostly spotted but not heavily. Flowers varying from almost white to pale pink. Lobation of lip variable but all of *Fuchsii* type. The soil is very strongly ferruginous.—G. C. BROWN. "I agree."—FRASER. "Yes."—HALL and SLEDGE.

Allium vineale L., var. *compactum* (Thuill.). Burnham, N. Somerset, June 29, 1932.—H. FOSTER. "The right name for the wholly bulbiferous form."—FRASER. "Yes, the common form of this species in England."—DRABBLE.

Juncus subnodulosus Schrank. Mitcham Common, Surrey, August 8 and 31, 1932.—E. C. WALLACE. "Rightly named."—FRASER. "Exceedingly rare in Surrey; an excellent find on well worked ground."—LOUSLEY. "Yes. Stem with only one articulate leaf, those at the base reduced to brown sheaths. Panicles lax, repeatedly compound, with branches divaricate or reflexed. Perianth segments pale, oblong, equal, blunt, connivent, slightly shorter than (Bab., 427, gives 'equalling') the ovoid, acuminate, brown capsules."—PEARSALL.

Potamogeton alpinus Balb. [Ref. No. D.14/L.] In about three feet of water, S.-W. shore of Loch Clunie, East Perthshire, August 11, 1932. Specific name confirmed by Mr W. H. Pearsall, who has seen the whole gathering. Does this fall under var. *lacustris* Marsson?—J. E. LOUSLEY. "Beautiful examples of this variable species. There are few of the coriaceous floating leaves but the submerged leaves are very characteristic. They are narrow, very gradually tapering and acute. The actual tip has the convex margins associated with the leaves of this species. The coffee-coloured leaves show up well the lighter reticulate midrib. Several fragments of *Callitriche autumnalis* were seen on some of the sheets. In answer to Mr Lousley's query, this is not var. *lacustris* Marsson. That is a deep-water form with submerged leaves much longer and narrower than these, and internodes at least twice as long as those of the Loch Clunie plants."—PEARSALL.

Potamogeton alpinus Balb. [Ref. No. D.9.] Near Newark Priory, Surrey, August 20, 1932. Sent to show mature fruits.—J. E. LOUSLEY. "A broader-leaved form of this species. These sheets are valuable as showing very fine and typical fruits."—PEARSALL.

Potamogeton pusillus × *crispus* (× *P. Bennettii* Fryer), teste PEARSALL. [Ref. No. D.15.] Several fine clumps in a stream near Albury, Surrey, October 9, 1932. As I did not discover this rare hybrid until October, it was impossible to get specimens in perfect condition, but I hope to regather it next year.—J. E. LOUSLEY. "Most interesting and acceptable. This hybrid is very similar in habit and appearance to *P. crispus* and in the original Stirlingshire habitat grows intermixed with that species. So recently as 1930 the late Dr Druce sent me from this station several sheets upon which both species were represented. Owing to this superficial similarity it is therefore absolutely essential to examine each plant under the microscope. This has been done with Mr Lousley's plants, all of which are authentic *P. Bennettii* (*P. crispus* × *pusillus*). Fryer (p. 53) thought this *crispus* × *obtusifolius* and describes the stem as 'intermediate in compression and general facies between the stems of *crispus* and *obtusifolius*.' His figure (Pl. 33 (4)) of the stem-section is much too long. In these two species the stem-sections are rounded oblongs, twice as long as broad, both long sides furrowed—very slightly in *obtusifolius*, more deeply in *crispus*. It is therefore conceivable that the stem of any hybrid between them would show an oblong section whose L/B ratio would be roughly 2 : 1. The stem-section of *P. Bennettii* is not at all of this shape but broadly elliptical as in *pusillus*, the L/B ratio of both being approximately 11 : 9. The evidence for *P. crispus* is seen in the deep furrows in each of the longer sides. The stem of *P. pusillus* is not furrowed in the least. Apart from the evidence afforded by the stem is that to be seen in the leaves. As a field character, the presence of axillary fascicles of narrow stem-leaves—reminding one of *P. Friesii*—is of value. Fryer correctly describes and figures these, but his statement (p. 54) that the leaves are 'entire or with very minute spine-like serrulations towards the apex not visible to the naked eye *nor when dried*' needs correction so far as the last three words are concerned. I have examined, in the dry state, plants of the original gatherings; of Dr Druce (1930); and all of the present gathering, and find the large leaves show distinct serrulation near the apex and occasionally lower down also (*none* resembles Hagström's Fig. 24E). The smaller leaves show few, but distinct, spines near the apex of young and clean specimens. The minute denticulations are easily abraded in the older leaves. The normal stem-leaves are 3-nerved and frequently become 5-nerved in the lower part only. The midrib is very wide and conspicuous, with prominent elongate lacunæ. For previous Surrey records, see Plant Notes, *Rep. B.E.C.*, 1932."—PEARSALL.

Potamogeton panormitanus Biv. Bern. Esthwaite Water, v.-c. 69b, June 29, 1932.—W. A. SLEDGE. "These examples are most carefully displayed and a joy to examine. They are mounted on semi-transparent white paper and it is therefore possible under the microscope to investigate the diagnostic characters of the leaves and stipules. The leaves lack the one or two rows of transparent lacunae on either side of the midrib, so characteristic of *P. pusillus*. In *P. panormitanus* these lacunae are seldom developed except in the uppermost and involucral leaves. The stipules are very delicate, tubular in the lower part, with their margins united to above the middle of the stipule, finally splitting and becoming lacerate at the apex. In my paper (*Rep. B.E.C.*, 1929) v.-c. 69 was inadvertently omitted on p. 155 but will be found recorded on p. 153."—PEARSALL.

Eriophorum gracile Roth. [Ref. No. D.7.] Near Aldershot, Surrey, July 3, 1932. Still plentiful, though limited to a very small area, in the sole remaining Surrey locality, where it was discovered by W. H. Beeby.—J. E. LOUSLEY. "Yes."—DRABBLE.

Carex sylvatica Huds. Newhall wood, Rutland, June 1932.—F. A. SOWTER. "Much too young, but correctly named."—PEARSALL.

Carex flacca Schreb. Bog near Saltby, Leicester, June 1932.—F. A. SOWTER. "Interesting plants. The fruits are markedly 'dotted,' rough and spiny in the upper half, exactly as figured in Coste iii, No. 5852, p. 505."—PEARSALL.

Carex pallescens L. Swampy wood, Middlewick, E. Donyland, N. Essex, v.-c. 19, June 19, 1932. A tall and slender form. The species is very rare in the district.—G. C. BROWN. "Correct, but the spikelets are rather small for this species."—FRASER. "Yes, with minutely punctulate oblong ellipsoid beakless fruits."—PEARSALL.

Carex elongata L. Roudsea Wood, Haverthwaite, N. Lancs, v.-c. 69b, June 27, 1932. A few specimens, taken from a single large plant, as vouchers for the occurrence of this sedge in N. Lancs. Though recorded for v.-c. 69 in the *Comital Flora*, neither Mr Pearsall nor Mr Wilson are aware of any previous record for N. Lancashire or Westmorland and Mr Chapple informs me that there are no specimens from these areas in the late Dr Druce's herbarium.—W. A. SLEDGE. "This is certainly a new record for N. Lancs. I visited Roudsea Wood several times annually for 30 years and never saw it, although looking for *Carex*."—PEARSALL.

Carex remota L. Hedge bank in lane near Brookfield, Bovey Tracey, South Devon, v.-c. 3, July 15, 1932.—C. WATERFALL. "All the spikelets are male at the top only. *C. remota* belongs to the class having spikelets male at the base (or at both ends) and is easily distinguished in the field by its long leaf-like bracts exceeding the inflorescence. These plants are *C. divulsa* Stokes."—PEARSALL. "*C. divulsa* Stokes."—BRITTON, WALLACE, FRASER and SLEDGE.

Carex contigua Hoppe. Beckley, Oxon, June 14, 1932.—J. Chapple. "Correctly named."—Fraser. "Correctly named but rather young. Many of the sheets however show fruits containing the characteristic obtusely quadrangular nuts. The beak of the fruit is very deeply bifid and serrulate well down to the shoulders. The ligules and opposite appendages are those of this species."—Pearsall.

Carex Pairaei F. Schultz. Dry hedgebank, Westcott, Surrey, July 15, 1932.—E. C. Wallace. "Most interesting plants and very similar to many found in herbaria under the same name, but which, in our considered judgment, are *C. divulsa*. The habit, habitat, spikes and leaves suggest *C. Pairaei*, but the fruits and nuts are those of *C. divulsa*. These latter are too narrow, too gradually tapering above and below, and are ovate-lanceolate in shape. Their L/B ratio is 2½-3 : 1. Their nuts are much longer than broad. In *C. Pairaei* the fruits are broadly oval, with a L/B ratio of 3 : 2. They are relatively much wider than those of *C. divulsa*, and have a much more rounded base and shorter beak. The most distinctive character of *C. Pairaei* is found in its nuts. These are obtusely quadrate in shape and described by Husnot (*Cyper. Fr.*, 1905-06, 18) as being "as broad as long." I have never yet seen any quite as broad as this, but my examination of authentic material with a micrometer scale gives the L/B ratio as approximately 17 : 15. These are also the relative dimensions of the figure of F. Schultz in *Flora*, li (1868), 302, wherein the species was first described. This figure is still the largest, clearest and most accurate representation available. The most reliable figures of the comparative shapes and sizes of the fruits and nuts of *C. Pairaei* and *C. divulsa* are those of F. Schultz (*l.c.*, and *Etude Carex* (1868), p. 9, t. 1-2); Coste, *Fl. Fr.* (1906), iii, 498; Kükenthal, *Pflanzenreich*, iv, 20, 155; and Husnot (*l.c.*), in the order given."—Pearsall. "Not *C. Pairaei*, but a form of *C. divulsa* Stokes with the spikelets closer together than is usual. The ligules, perigynia and nutlets are characteristic of *C. divulsa* Stokes."—Britton.

Panicum miliaceum L. Waste land at Cheam, Surrey, September 9, 1932.—E. C. Wallace. "Yes."—Howarth, Hubbard and Fraser.

Phleum phleoides Simonkai. [Ref. No. D.18]. The Furze Hills, Hildersham, Cambs, August 2, 1932.—J. E. Lousley. "Correctly named. The keel of the barren glume is thinly and shortly ciliate or sometimes merely scabrous. There is a rudiment of a second flower."—Fraser. "Yes."—Howarth and Hubbard.

Polypogon monspeliensis (L.) Desf. [Ref. No. 850]. Saltmarsh, near, Farlington, S. Hants, v.-c. 11, October 2, 1932. This species has been distributed several times in recent years but always from stations where it is adventive. Members may like to have indigenous specimens from a station where it has been known for more than 300 years.—P. M. Hall. "Yes; well developed specimens."—Fraser. "Yes."—Howarth and Hubbard.

Calamagrostis Epigeios Roth. [Ref. No. 986.] Ripe panicles. Roadside, Dunton, Bedfordshire, September 26, 1932.—Leg. M. BROWN and J. E. LITTLE, comm. J. E. Little. " Rather old, but very fine panicles 25-27 cms. long. Flowering glume with a short, slightly curved awn from the middle."—FRASER. " Yes."—HOWARTH and HUBBARD.

Deschampsia flexuosa Trin., var. *montana* Hook. fil. Beacon Hill, Mendips, N. Somerset, v.-c. 6, June 18, 1932.—IDA M. ROPER. " *Deschampsia flexuosa* Trin."—HUBBARD. " I do not agree with this as variety *montana* which is quite a small plant with short and somewhat broader leaves and a contracted, compact panicle. It is just the type." —HOWARTH. " I think not var. *montana* (L.) Gremli (I cannot trace the Hooker reference), which has larger flowers as well as red coloration. and is generally a shorter plant."—WILMOTT. " The glumes of these specimens are a little more highly coloured than usual, but leaves and stems are too long for a subalpine plant, and the lower floret is not longer than the barren glumes."—FRASER. " This is not the var. *montana* of authors, which is much more " stocky " with shorter stem and leaves and much larger glumes, and which is almost or quite restricted to high altitudes. I doubt if these Mendip specimens are more than a striking colour form."—LOUSLEY.

Trisetum flavescens (L.) Beauv. Near Lambridge Wood, Henley, Oxon, July 23, 1932.—J. CHAPPLE. " Yes."—HOWARTH, HUBBARD and FRASER.

Cynosurus echinatus L. Banks of Trent Pool near Long Eaton, Derbyshire, June 17, 1932.—R. BULLEY. " Yes."—HOWARTH, HUBBARD and FRASER.

Cynosurus echinatus L. [Ref. No. D.25]. Shingle, Bungalow Town, Shoreham, West Sussex, June 26, 1932. Most of the plants were very depauperate, a state due, no doubt, to deficiency of moisture in the upper layers of the shingle accessible to the shallow roots of this grass. The usual luxuriant form, now very frequent about London, provides a vivid contrast to the smaller specimens of this gathering.—J. E. LOUSLEY. " Yes."—HOWARTH and HUBBARD.

Koeleria britannica × *vallesiana* ?. Brean Down, N. Somerset, June 25, 1932. Growing with a patch of undoubted *K. britannica* and like it with the exception of the inflorescence, which has a distinctly different facies. *Vallesiana* grows in the neighbourhood.—H. FOSTER. " Probably *K. gracilis*, var. *gypsacea* Domin."—HUBBARD. " Domin's description of this hybrid does not tally in the slightest with Mr Foster's plant. *K. gracilis*, var. *gypsacea* is based on a gathering from near Oxford. The plant is glabrous, but otherwise our plant corresponds fairly closely, and I should therefore refer it to *K. gracilis* Pers., approaching var. *gypsacea* Domin."—HOWARTH.

Melica uniflora Retz., f. *floribus albis*. Matfield, Kent, v.-c. 16, August 17, 1932. A form with white glumes, not due to shade, growing along a bank for 100 yards. An exactly similar form was found by Mr E. D. Morgan in Sussex about the same time.—W. H. PEARSALL. "*M. uniflora* Retz., forma. I have collected *Poa pratensis*, var. *angustifolia* this year at Windsor in a similar condition."—HUBBARD. "This is a form quite new to me."—HOWARTH.

Poa pratensis L., var. *angustifolia* (L.). Avonmouth Dock, Bristol, W. Gloster, v.-c. 34, June 14, 1932.—IDA M. ROPER. "Yes."—HUBBARD. "Linné gave it specific rank; Smith is responsible for it as a variety."—HOWARTH. "Yes the narrow-leaved variety of *Poa pratensis*, which Linnaeus described as a species."—FRASER. "Yes, so I should name it."—DRABBLE.

Poa nemoralis L. Matfield, Kent, v.-c. 16, September 3, 1932.—W. H. PEARSALL. "Yes."—HUBBARD. "Well developed *P. nemoralis*."—FRASER. "I believe this is the variety *coarctata* Gaud., but it requires the root-leaves for confirmation."—HOWARTH.

Poa bulbosa L. Sandy waste, St Helens, Isle of Wight, May 1920.—J. W. LONG. "Correct; neat, short specimens. One piece of mine shows how the plant can elevate itself again, if it happens to get buried with sand."—FRASER. "Yes."—HUBBARD and HOWARTH.

Bromus erectus Huds. Shacklewell Hollow, Rutland, June 1932.—F. A. SOWTER. "Yes."—HUBBARD. "Correct; a form or state with reddish-purple flower glumes."—FRASER. "Is the var. *villosus* Kunth."—HOWARTH.

Bromus secalinus L., var. *velutinus* (Schrad.) Koch. Dry Sandford, Berks, July 7, 1932.—J. CHAPPLE. "Yes."—HOWARTH, DRABBLE, and FRASER. "*B. secalinus* L., var. *hirtus* Schultz."—HUBBARD.

Bromus pratensis Ehrh. Runnymede, Surrey, June 26, 1932.—J. FRASER. "Yes."—HUBBARD. "This name must be rejected because although published in 1791 the plant was not then described. The accepted name is *B. commutatus* Schrad."—HOWARTH.

Brachypodium sylvaticum Roem. & Schul. Lanes near Brookfield, Bovey Tracey, South Devon, v.-c. 3, July 15, 1932.—C. WATERFALL. "Yes."—HUBBARD. "Yes, the type."—FRASER. "The softly hairy stems, leaves and spikelets suggest the var. *dumosum* Beck."—HOWARTH.

Brachypodium pinnatum (L.) Beauv. Northleigh Common, Oxon, August 14, 1932.—J. CHAPPLE. "Yes."—HUBBARD. "The type, with smooth flower glumes."—FRASER. "This is the var. *gracile* Pospichal, characterised by the glabrous spikelets, not more than 2 cm. long, fertile glumes with short awn; leaves narrow, ligules short; root tufted. It is synonymous with *B. caespitosum* R. & S., *B. pinnatum*, var. *caespitosum* Koch and *B. intermedium* Schur. It also appears to be the *B. pinnatum*, var. *caespitosum* Parnell and not his var. *gracile* which has longer awns. Parnell does not make clear the real differences between his *B. pinnatum* and his varieties *caespitosum* and *gracile*."—HOWARTH.

Agropyron repens Beauv., var. *lasiorachis* Hack. [Ref. No. 4023.] Lower Morden, Surrey, July 29, 1932.—C. E. BRITTON. "Correct."—HUBBARD and HOWARTH. "Yes, the rachis is right but the pales are much more strongly ciliate than in the specimens sent to the Watson Club in 1931 by Mr Lousley and confirmed as *lasiorachis* by Mr Howarth."—DRABBLE. "Correct with its densely pubescent or woolly rachis. It is evidently fairly frequent."—FRASER.

Equisetum sylvaticum L., var. *capillare* (Hoffm.). Thicket (dry in summer) on Holmwood Common, Surrey, August 27, 1932.—E. C. WALLACE. "Yes."—DRABBLE. "I agree. The finest specimen I have seen from England or Wales."—FRASER.

Ceterach officinarum DC. Crevices of old walls near Compton Castle, Marldon, South Devon, v.-c. 3, July 20, 1932.—C. WATERFALL.

Osmunda regalis L. Ditches about the bog at Newbridge, Dartmoor, South Devon, v.-c. 3, June 28, 1932.—C. WATERFALL.

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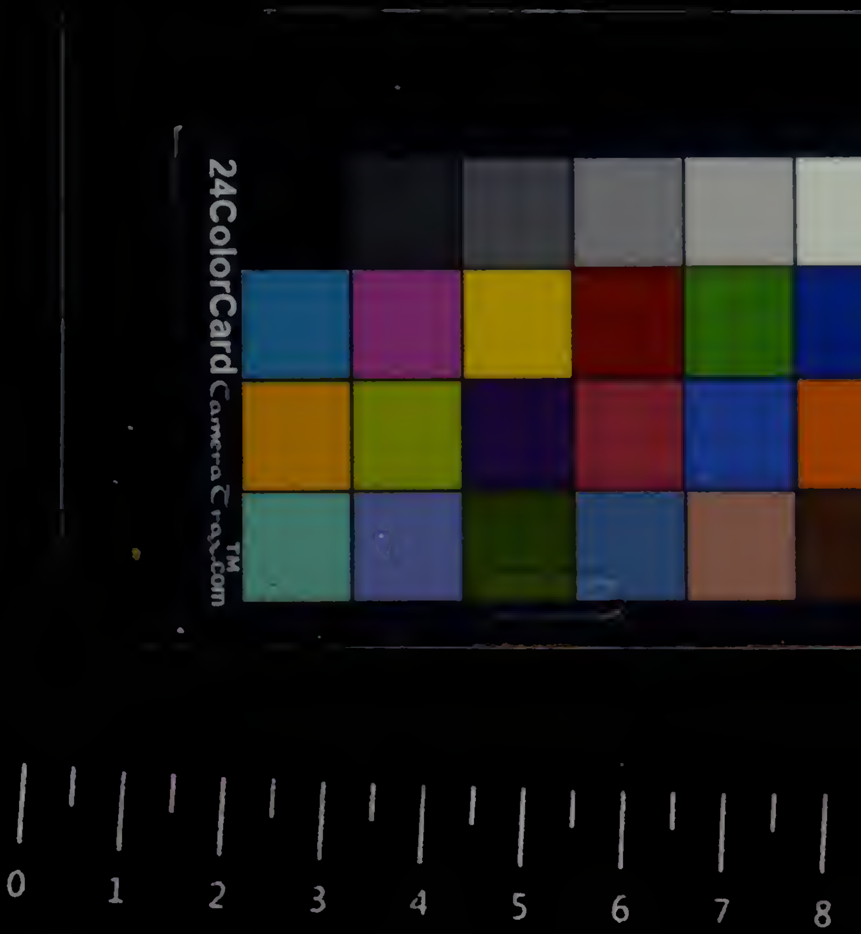
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